ORTHOPEDICS NUMBER

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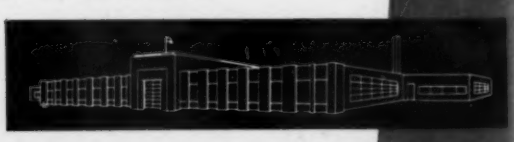

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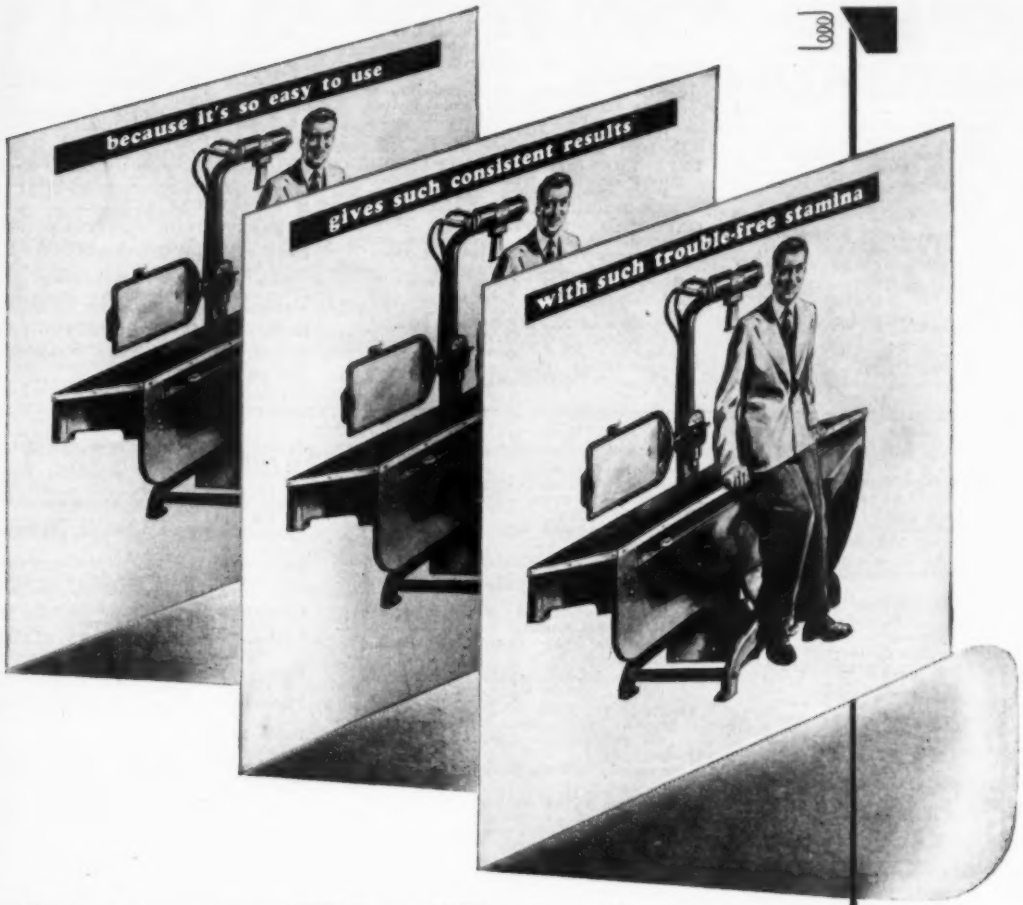

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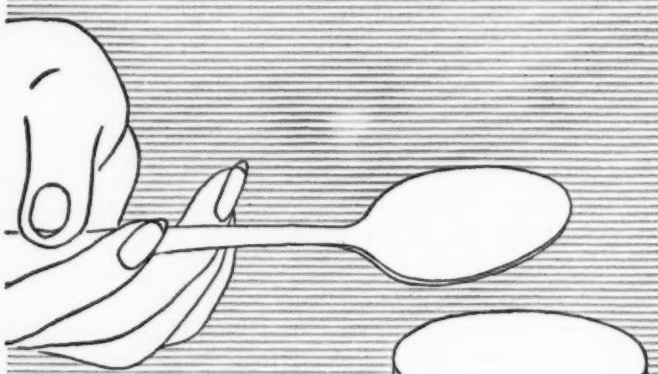

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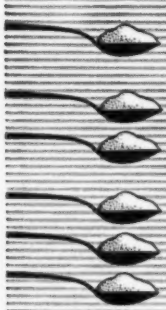

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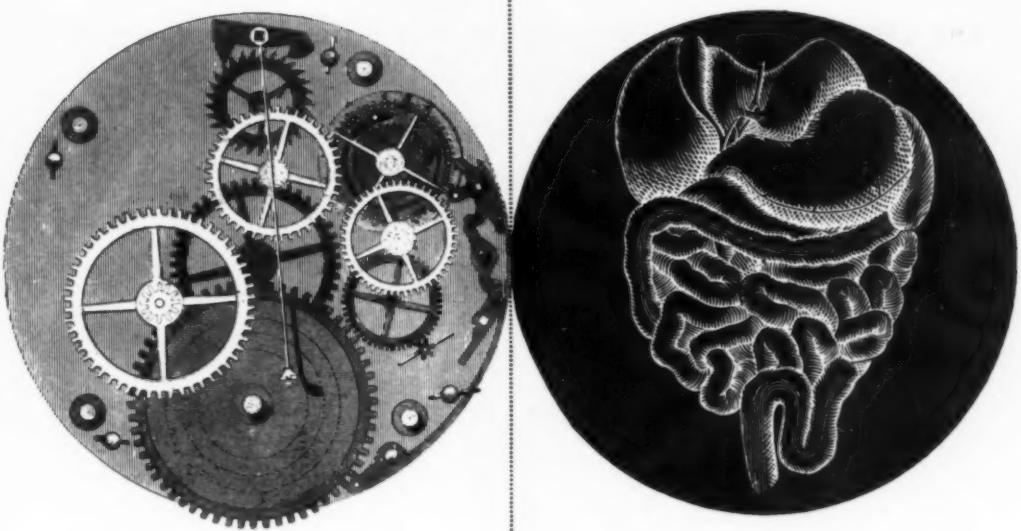

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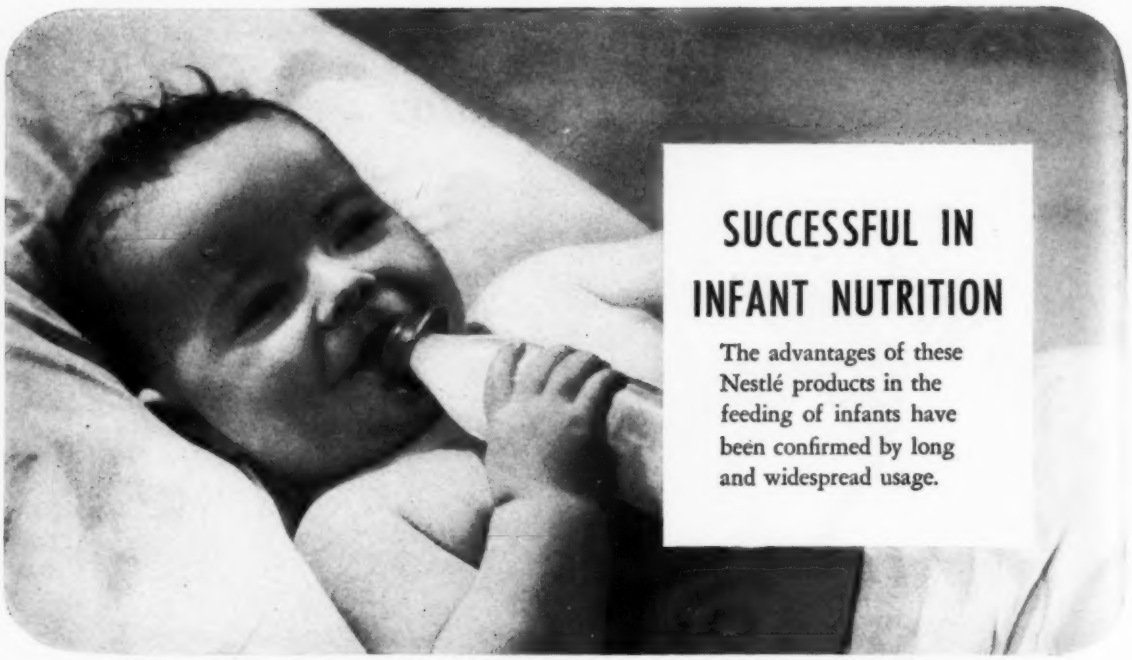

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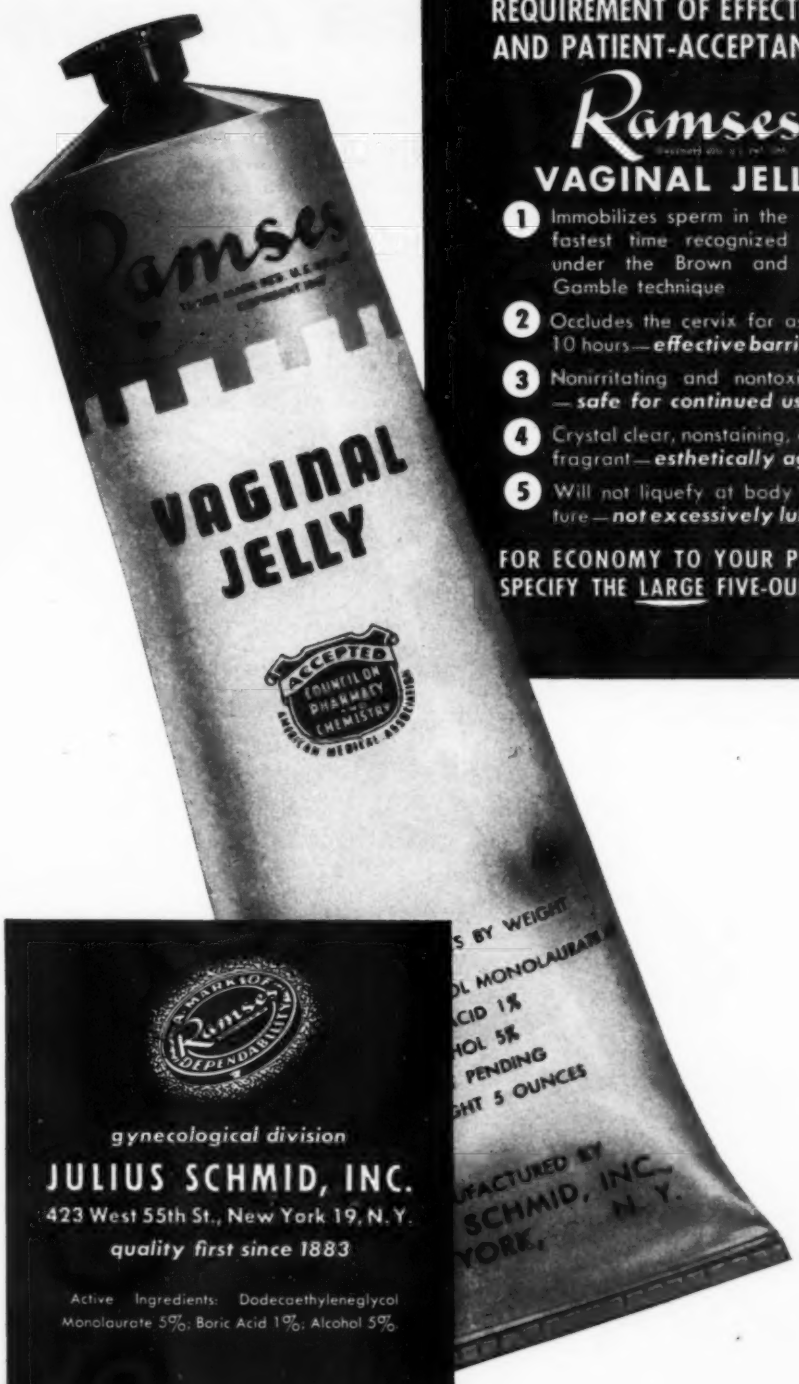

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With Vi terra, the physician or surgeon can anticipate more rapid and potent effects than can be obtained with less complete formulations.

ALL IN ONE CAPSULE

VITAMINS		MINERALS	
Vitamin A *(Refined Fish Liver Oil)*	5,000 USP Units	Cobalt *(Cobaltous Sulf. .7 H_2O)*	0.1 mg.
Vitamin D *(Irradiated Ergosterol)*	500 USP Units	Copper *(Cupric Sulfate)*	1 mg.
Vitamin B_1 *(Thiamine Hydrochloride)*	3 mg.	Boron *(Sodium Metaborate)*	0.2 mg.
Vitamin B_2 *(Riboflavin)*	3 mg.	Iron *(Ferrous Sulfate)*	10 mg.
Vitamin B_6 *(Pyridoxine Hydrochloride)*	0.5 mg.	Iodine *(Potassium Iodide)*	0.15 mg.
Niacinamide	15 mg.	Calcium *(DiCalcium Phosphate)*	213 mg.
Vitamin C *(Ascorbic Acid)*	50 mg.	Manganese *(Manganous Sulf.)*	1 mg.
Calcium Pantothenate *(Dextro)*	5 mg.	Magnesium *(Magnesium Sulf.)*	6 mg.
Mixed Tocopherols Type IV	5 mg.	Molybdenum *(Sodium Molybdate)*	0.2 mg.
		Phosphorus *(DiCalcium Phosphate)*	165 mg.
		Potassium *(Potassium Sulf.)*	5 mg.
		Zinc *(Zinc Sulfate)*	1.2 mg.

DOSAGE: **Due to the catalytic-synergistic action of certain minerals with vitamins in vivo, it is suggested that one Vi terra capsule a day will serve adequately for supplementary nutrition. For quicker results three or more Vi terra capsules daily may be prescribed. Supplied in bottles of 100 capsules. You are invited to send for a clinical trial supply.**

Vi terra

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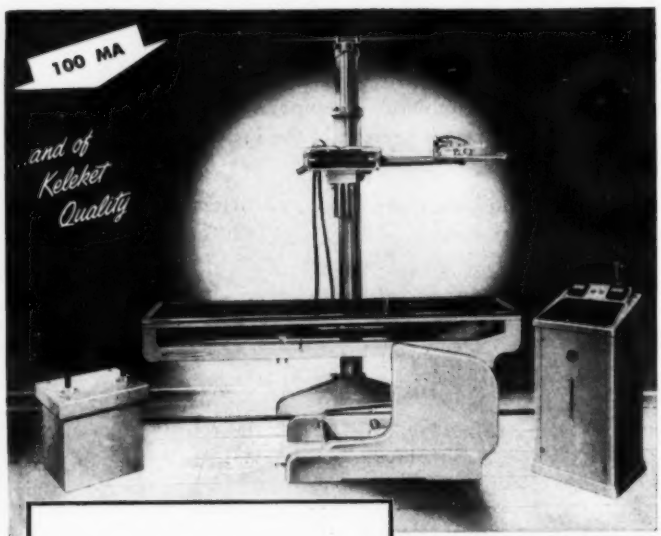
as low as $1641.00 or with NON-tilt table, $1366.00

...for FULL RANGE Fluoroscopy and Radiography



Above: 100 MA Combination with the basic table and Floor-To-Ceiling tubestand and the famous Multicron 100 Generator.

Keleket scores again, with a new approach to the use and purchase of X-Ray equipment. Keleket has developed a FULL SIZE Standard Tilting Table with a completely new, highly flexible floor to ceiling tubestand. This basic x-ray equipment is equally adaptable for either 15 MA Head, 30 MA Head or 100 MA tube and generating units.

THROUGHOUT ALL INTERCHANGES YOU RETAIN THE SAME KELEKET "ADAP"-TABLE AND TUBESTAND.

This means you eliminate new table and tube stand costs as you step up tube capacity and power.

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Any of these combinations will fully meet your current needs . . . perform horizontal, vertical and trendelenburg radiography; vertical and horizontal fluoroscopy. Even the lowest cost unit, at $1641.00, is equipped to accommodate a bucky diaphragm. Write us or have our representative call to give you complete information on this newest development in low-cost, flexible X-ray equipment.

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Here is how the Keleket Add-A-Unit Combinations Work

Choose the combination to suit your practice!

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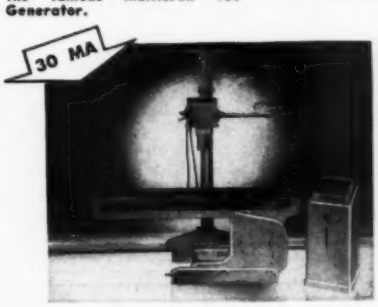
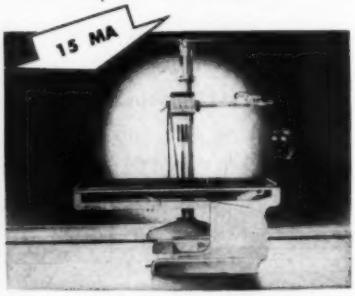


Above: 30 MA Combination with the same basic table and Floor-To-Ceiling tubestand and control.



Above: Same basic table and tubestand with 15 MA tubehead and control. This full size unit with non-tilt table, costs only $1366.00.

Generous Allowance Values... Your Original Investment Never Lost.

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A new approach to use and purchase of X-Ray equipment.

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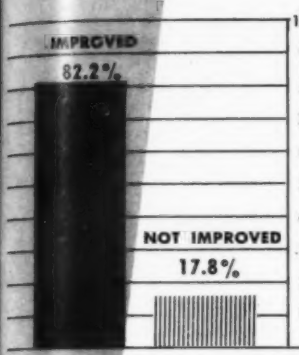
What do you look for in an antiarthritic ?



EFFECTIVENESS?

With Ertron,® local and systemic improvement has been reported in 701 out of 852 arthritic patients. Thus beneficial results were obtained in 82%; and no improvement was noted in only 17.8%. In a disease as resistant as rheumatoid arthritis, this is truly effective therapy.[1]

"No specificity is claimed for Ertron therapy. However, any substance which is non-toxic and which by its general systemic action does produce improved sense of well-being, diminution of soft tissue swelling, relief of pain, and improved muscle strength and which does make possible a return to gainful occupation, should be used in the treatment of arthritic patients."[2]

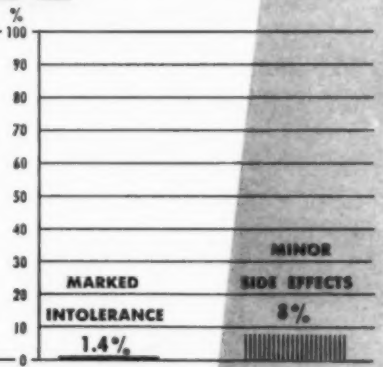
ERTRON

STEROID COMPLEX—WHITTIER

TOLERABILITY?

Tolerance to Ertron is high in patients under periodic observation. Untoward side reactions are rare.[3] In 1,020 arthritic patients, marked intolerance requiring cessation of therapy occurred in only 1.4%, while minor side effects, such as nausea, gastrointestinal upset, headache, etc., were encountered in about 8%.

"These mild digestive disturbances disappear almost immediately after the cessation of Ertron administration and usually do not recur when this therapy is again instituted."[4]



Ertron is supplied in bottles of 50, 100 and 500 capsules, and Ertron Parenteral in packages of six 1 cc. ampuls. Each capsule contains 5 milligrams of activation-products having antirachitic activity of fifty thousand U.S.P. units. Each ampul contains activation-products having antirachitic activity of five hundred thousand U.S.P. units, in sesame oil. Biologically standardized.

BIBLIOGRAPHY

(1) Magnuson, P. B.; McElvenney, R. T., and Logan, E. E.: J. Michigan M. Soc. 46:71, 1947
(2) Levinthal, D. H.; Logan, C. E.; Kohn, K. H., and Fishbein, W. I.: Indust. Med. 13:337, 1944
(3) Cohen, A., and Reinhold, J. G.: Indust. Med. 17:442, 1948
(4) Farley, R. T.; Spierling, H. F., and Kraines, S. H.: Indust. Med. 10:341, 1941

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References: 1. Dodd, K. and Minot, A. S.: *J. Pediat.*, 8:442, 1936.
2. Dodd, K. and Minot, A. S.: *J. Pediat.*, 8:452, 1936.
3. Sahyun, M.: *Am. J. Dig. Dis.*, 13:59, 1946.

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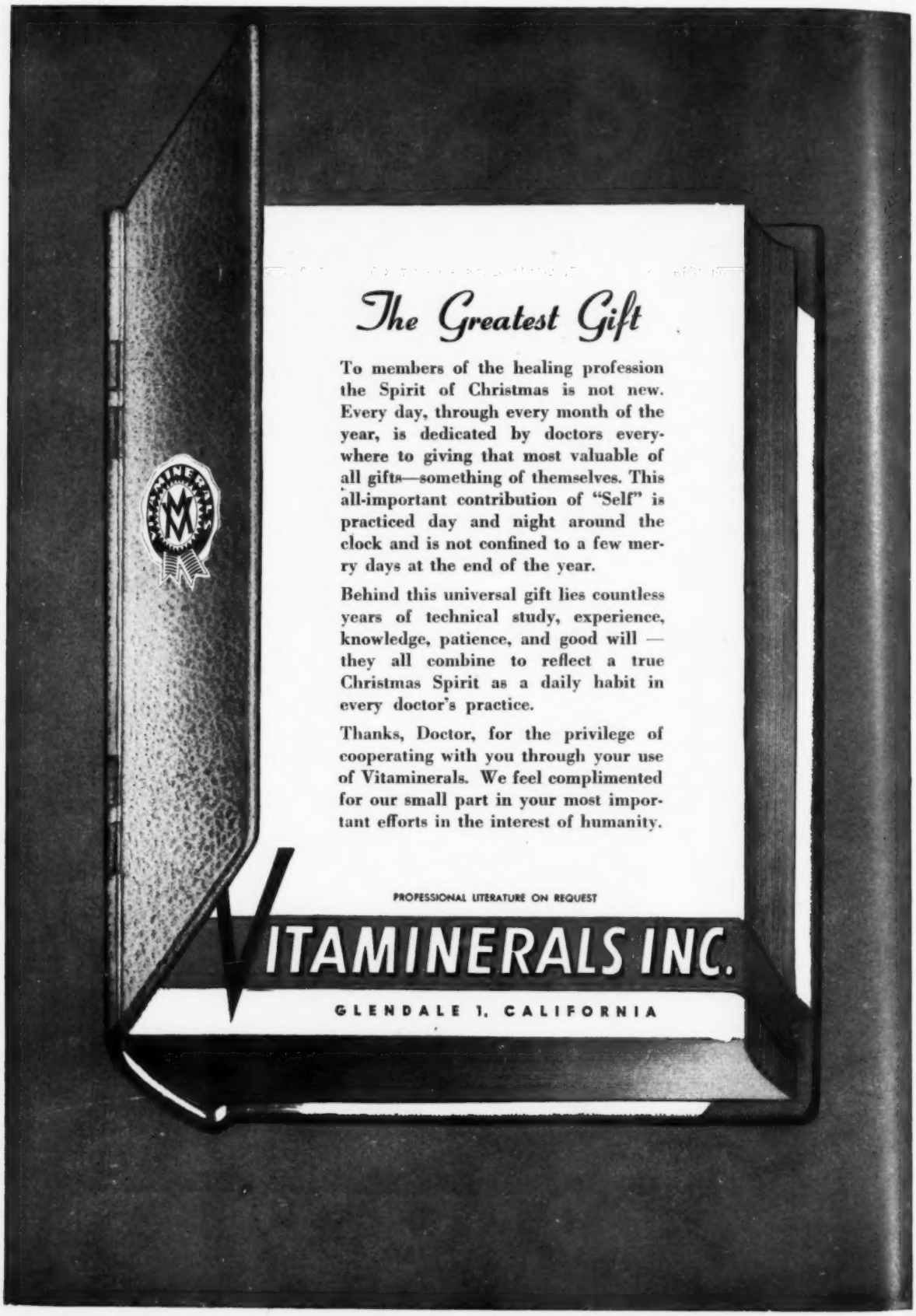
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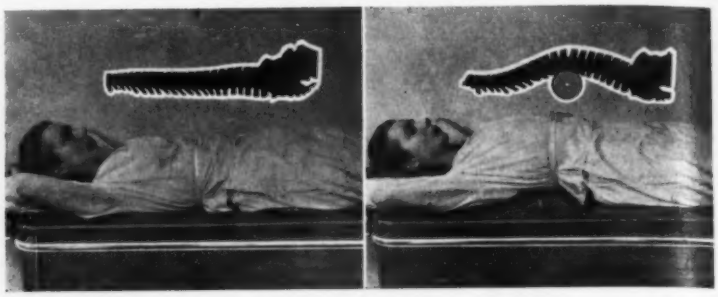

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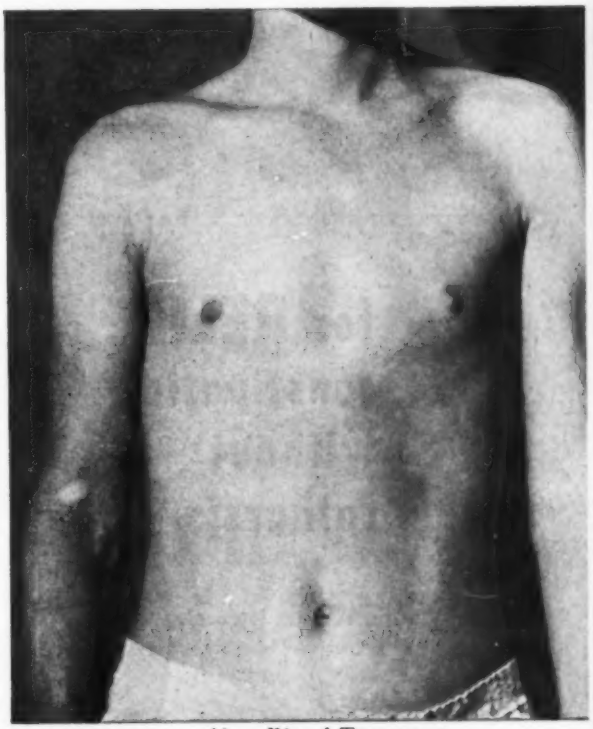

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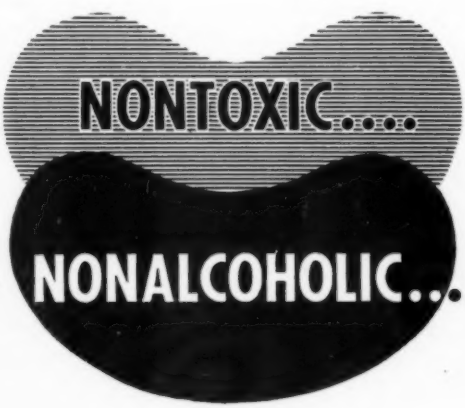

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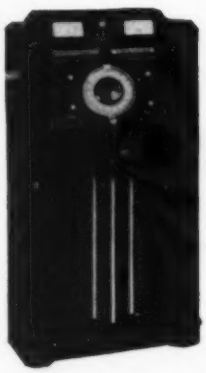

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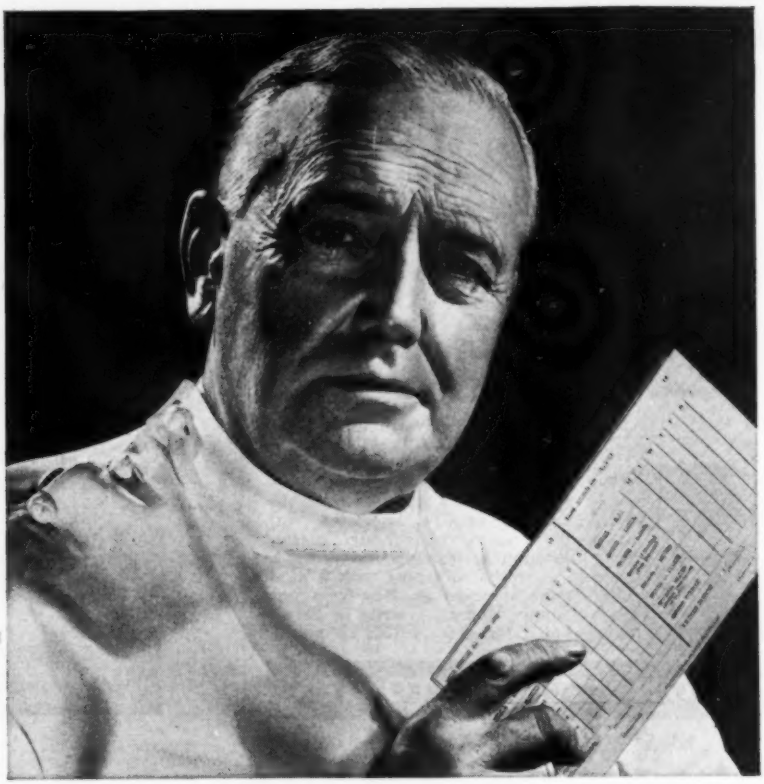

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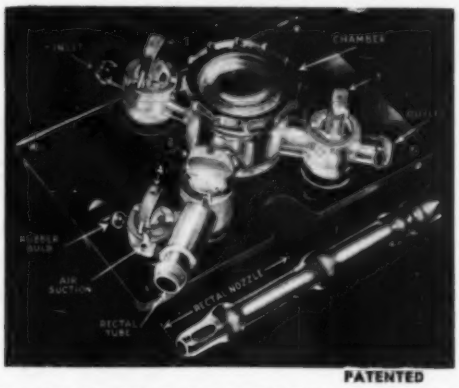

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The Evaluation of Specific Manipulation in Osteopathic Therapy*

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Los Angeles

Certain experiences during the past several years with hospital interns graduated from our several colleges have convinced me that the osteopathic profession needs more available scientific information about the values of osteopathic manipulative therapy in various diseases. I undertook to find out by extensive correspondence and conversation what other members of the profession thought of this apparent need and was surprised to learn the many differences of opinion. Some took the attitude that any attempt to secure statistics concerning osteopathic treatment would be for the purpose of convincing doctors of medicine of the value of osteopathy and that they would not believe the results of any clinical investigation we might conduct, and therefore it would be a waste of effort. Some believed that our greatest need was for better scientific explanations of our theories. They held that we already knew the value of osteopathic therapy but that it would be easier to secure its recognition if scientific research proved why it worked. Others felt that our investigations should be for the purpose of helping us improve our methods of diagnosis and treatment. Many stated their belief that there was no possibility of studying osteopathic therapy scientifically because of difficulties in standardizing the diagnosis of lesions and the methods of treatment. Ten or more different types of opinions could be sorted out of some one-hundred-and-fifty expressions on the subject. This diversity of attitudes is a source of misunderstanding and needs to be overcome for our professional welfare.

Because osteopathy utilizes the same sciences of physics, chemistry, anatomy, physiology, et cetera, as do old-school physicians, and because we face the same general problems, it seems reasonable to learn what lessons we can from their experiences. The difficulty that have had in reaching dependable conclusions regarding the value of their treatments is well known. In old-school medical literature we will find numerous straight-forward discussions dealing with their doctors' difficulties in this respect. As an example, in one recent analysis of what he calls "therapeutic fads," O. H. P. Pepper,[1] Professor of Medicine at the University of Pennsylvania, illustrates many apparent vagaries in scientific medicine. The remedies and technics referred to in this analysis include many that have been the mainstays of old school practice during recent decades. Indiscriminate tonsillectomies and dental extractions, controversial operations such as kidney and stomach suspension, renal decapsulation, removal of the colon, oophorectomy for nervous disorders, innumerable drugs that rode the wave of popularity for a time were all utilized enthusiastically by these "honest but self-hypnotized physicians," to use Pepper's expression, only to be later largely discarded as worthless or harmful.

A few years ago we were sure of the values of the sulfonamides. Research had shown when and how they worked. Nothing discovered concerning them suggested any possible beneficial effect against viral infection yet, because of the enthusiasm for them, they were soon being prescribed in every conceivable type of infectious disease. Today sulfonamides have lost much of their repute and they are being neglected in favor of penicillin and other agents even in cases where investigation has shown that the sulfonamides are probably more effective. Already the glamor of penicillin is fading and its limitations are being discovered. Chloromycetin and aureomycin and other antibiotics are in the ascendancy.

Two other excellent illustrations of medicines that have had a checkered career because of changing scientific concepts are iodine and cod liver oil. After chemists discovered iodine in the thyroid gland, its use as a medicine in thyroid disease was soon being promoted as a scientific procedure. When doctors began to apply statistical methods to the study of its use, results were found to be so erratic that, about 1910, the idea grew that there could not be any specific benefit in thyroid disease from iodine. A decade later with new knowledge of the varieties of thyroid diseases it was determined that iodine was helpful in some kinds of thyroid diseases and worthless or harmful in others. Iodine again regained scientific good standing. Cod liver oil, the value of which had been empirically recognized for many decades, in the early days of biochemistry was ridiculed as being only so much fat, by

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chemists who had not yet discovered the existence of vitamins A and D. With the discovery of the vitamins, cod liver oil soared into scientific recognition again.

In noting these diverse illustrations of seeming inconsistency, we should recognize certain facts. Ashley Montagu,[2] writing on primitive medicine, and Sigerist[3] in discussing the significance of medical history, have both emphasized that medical practice in any epoch has always been a consistent outgrowth of the popularly accepted scientific and philosophical concepts of the day, even though there have always been unaccepted leaders who were ahead of their time.

With these observations in mind, we can better understand the bewildering rapidity of the changes in medical practice and theory so prevalent today. The concepts of the material sciences are today the dominating influence in the lives and thinking of civilized mankind. It is a time when rapidly changing scientific theories are expected and when innumerable technical inventions and an overwhelming multiplicity of new chemical substances deluges us. This maelstrom of change is reflected in present-day medicine and in the attitude of laymen toward medical practice—only the new and the "scientific" is good. If the man in the street is convinced by publicity devices that a certain treatment conforms to the latest advance in science, he will demand that treatment from his doctor even though the doctor knows that a careful study of the modality has discredited it. In contrast to the stimulating novelty of weekly "medical" discoveries, osteopathic concepts and methods remain, year after year, apparently simple and unchanging. It appears that it will be necessary, in order to draw any attention to the principles on which osteopathy is based, to demonstrate them by the instrumental laboratory technics and couch them in the phraseologies that are current in modern medical science.

One particular way in which science is influencing medical practice undesirably is found in the wide utilization in medicine of the statistical method of study in the same manner that it is applied in the physical sciences, chemistry, and physics. Among the more critical leaders it is recognized that new methods of scientific inquiry and analysis are required when studying experimentally problems in the biological and medical fields.[4,5] In the study of disease we must modify our dependence upon conclusions from averages and respect the particular problem of the individual patient. For example, Captain F. E. LeBaron, D.O., M.D., writing of his experience in the United States Army Medical Corps[6] states, "there was approximately a 20 per cent better disposition [return to service] in those cases which were manipulated than in the control group." In the same article, he describes one particular patient with a definite osteopathic problem who received complete relief from a single specific osteopathic corrective treatment, where previous orthopedic treatment had made the condition worse. What one should note is that citing "20 per cent better disposition" was essentially giving information of the frequency of benefit of osteopathic treatment in a large group. Twenty per cent was not at all the measure of the value of the treatment in cases where there was a specific indication. The use of the figure, 20 per cent, in such a study had great value to the Army, but to the man who got 100 per cent relief and to the doctor who gave him the treatment, it was a poor measure of the importance of the treatment.

Two other illustrations of medical evaluation from recent literature may be cited. Harry Gold, and others,[7] collected and analyzed the results of treating 133 patients with congestive heart failure according to a particular new regime and compared these with the results in 376 similar patients in four other New York City hospitals where routines were followed that might be called present-day standards. Gold's results showed approximately 90 per cent of complete recoveries against approximately 54 per cent among the others. Such figures certainly indicate that on the average Gold's therapy was better than that in the other hospitals. Similarly, sixteen hospitals working under a committee of the American Heart Association, agreed to treat every alternate case admitted suffering from myocardial infarction by adding the use of Dicumarol or Heparin to the routine treatment. The preliminary report[8] on approximately 800 cases showed that 24 per cent died when anticoagulants were not used whereas only 14 per cent died when they were used. This proves only that adding anticoagulants to the routine treatment gives better results on the average. Both reports have made a dominating impression on practice. In fact, acceptance of Dicumarol is so nearly universal during recent months that a physician is facing a medicolegal hazard if he fails to use it. Yet neither of these reports is a definite help in choosing the proper therapy for the individual patient, John Smith. This choice depends upon a careful study of John Smith himself. Either of these treatments may be actually harmful in some cases. The figures indicate only that the program of treatment studied may have value in a particular condition and should not be overlooked. Statistical investigation is the mode of the day in old-school medical circles and in the minds of educated people generally, but its values, worthwhile as they may be, have definite and serious limitations.

Another idea that needs correction is that laboratory science is infallible. Arthur Steindler,[9] the famous orthopedist, in discussing anterior poliomyelitis has pointed out clearly that "there are too many discrepancies between the situation existing in animal experiments and that obtaining at the bedside to make any laboratory results absolutely binding . . . . We cannot, however, be blind to the fact that, in many perplexing problems concerning anterior poliomyelitis, experimental science and basic medicine have opened our eyes to certain traditional mistakes and misconceptions which will have to be corrected or revised." Isaac Starr,[10] Professor of Therapeutics at the University of Pennsylvania, and Alan Gregg[11] of the Rockefeller Institute, have both recently written very helpful analyses of the true relation of scientific laboratory studies to clinical practice.

Not very many years ago medical scientists held in ridicule any attempt to draw conclusions from observing the results of treatment in actual practice. This attitude has changed until now it is recognized that no scientific discovery can properly be accepted in practice until it has been subjected to clinical test. It is being appreciated that the problems of therapy are too complicated to allow dependence solely upon rationalization of therapy from a knowledge of physiology, pathology, pharmacology, and other basic sciences.[12] The American Medical Association, in fact, has set up a Committee on Therapeutic Trials[13,14] which will aid interested groups in outlining the exact program needed to investigate the actual results of clinical treatment.

The Osteopathic Research Board in our profession is intended to provide a similar though less comprehensive type of assistance.

With this background concerning therapeutic studies in general, we may turn our attention to the problem of evaluating the therapy that is utilized by osteopathic physicians. There are two general plans to consider. We might compare the published results secured in a particular disease under standard allopathic care with the results compiled from osteopathic physicians using the composite treatment that is common in osteopathic practice. This might, in some cases, prove that the osteopathic physician and surgeon gets better results on the average than the old-school physician and this might bring credit to the osteopathic profession. But it would give no definite information regarding the specific benefits of osteopathic manipulative therapy. Results could be better simply because certain harmful medicinal treatment had been omitted or because of the good hygienic or psychological management given by the osteopathic physician.

We must recognize, at this point, that osteopathy as a system of practice is a complete system of the practice of medicine and surgery. It utilizes, when they are indicated, all of the medicinal, surgical, immunological, psychological, and hygienic agencies accepted and utilized by so-called orthodox medicine and surgery and is grateful for all that the world of science makes available. But the methods of osteopathic practice differ from those of old-school medicine and surgery in two respects. One, in appropriate cases, where structural maladjustments are found, certain distinctive manipulative procedures are utilized for the purpose of correcting these structural maladjustments, the presence of which contributes to the cause of or impeded recovery from certain disease states. Second, it uses different criteria in selecting and applying the agencies of scientific therapy, from those of old- school medicine and surgery, because of osteopathy's greater recognition of the spontaneous recuperative capacities of the normal body in a normal environment and because its manipulative procedures alter the need for and the response to so-called orthodox treatment.

Because of these characteristics of comprehensive osteopathic practice, a second plan of study becomes pertinent: the investigation of the results following the use of corrective osteopathic manipulation under properly planned conditions and the measurement of the value derived from this particular procedure. If we are to win any credit for what is distinctively osteopathic, we must be careful not to claim as being "osteopatic" contributions,[4] methods of treatment utilized before the advent of osteopathy. Certain forms of manipulative treatment have long been used by orthodox medicine. Dieting, psychological management, exercise and various physiotherapeutic procedures, as well as drugs and surgery, may be claimed as having been developed by it.

The general concepts that nature cures, that structure determines function, that function modifies structure, that environment influences health, that the removal of causes should be the basis of treatment—these with more or less emphasis have been the teachings of leaders of medical thought for centuries, however much present day allopathic practice seems to ignore or belie these sound concepts. In an academic sense, everything that conforms to these principles may be "osteopathic" as well as "medical," but there is one concept in particular, as I understand it, that clearly sets off Andrew Taylor Still's approach to the treatment of disease from that of any other who preceded him. We all know these basic ideas: disease, or obstruction to recovery from disease, may be caused by mechanical maladjustments of parts of the body, which have been produced by stress or accident. In cases where this has occurred, the correction of faulty anatomical relations by manual or other mechanical agencies is necessary to release the healing powers and allow recovery.

As the years passed, the use of manipulation for the purpose of stimulating or inhibiting or to augment circulation became a large part of osteopathic practice, but whatever one thinks Still may have stood for, the idea held among the profession's earlier leaders was that the manipulative correction of acquired structural deviations was the essential characteristic of osteopathic practice. Hulett[15] states that any treatment whose "effect is to modify the vital processes themselves . . . is medical. If its effect is to remove conditions which are interfering with these processes, it is osteopathic." This does not mean that relaxing a muscle is always nonosteopathic. If doing this is for the purpose of releasing obstruction to some vital process, it is osteopathic by Hulett's definition. Osteopathy was built upon this concept, won its reputation by the successful application of this concept in a great variety of apparently hopeless diseases and owes its existence and original recognition as a separate school to the popular belief that osteopathic physicians made it the basis of their practice.

A survey of the 1200 case reports collected by Edythe Ashmore[16] and published in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION from 1903 to 1909 showed that fewer than one-seventh of them were concerned with back pains, neuritis, headaches, and similar complaints. They were based upon the structural corrective treatment of the body for the relief or cure of the most varied conditions, from amenorrhea to pernicious vomiting. This is not intended to belittle the effectiveness in proper conditions of manipulation to excite changes in reflex activity or circulation. But, for the reasons recited, our attention in osteopathic evaluation should be concerned chiefly with the value of the form of treatment by manual correction of structure which is popularly known as specific osteopathic treatment. Our profession is too small and too lacking in financial resources to justify spending our means on the study of any unessentials if we expect to justify our existence.

Even with this restriction there are many problems that need study. We should know more of the nature of the anatomical and pathological changes in and around the disturbed area of the spine, which we consider to be the Still lesion. There are problems of great complexity as to what changes are really brought about clinically in the lesioned area by attempts at correction and as to how permanent so-called corrections are and how the anatomical deviations respond with varying technics. There is a group of questions concerning the physiological and anatomical consequences produced in organs remote from the lesion and brought about by its existence. Louisa Burns[17] has reported hundreds of such observations on lesioned animals in regard to both of these problems, but this work needs to be repeated with newer technics. However, this type of study belongs in the category of

experimental research rather than clinical investigation.

The essential problem that is being emphasized here is ascertaining what the results are which are secured from the use of corrective osteopathic treatment in various specific disease states. This problem has no concern with attempts at scientific theorizing as to how results are produced. Questions of the following types should be answered: What diseases may be definitely cured by the body following corrective osteopathic treatment? Are all persons who present, for example, chronic peptic ulcer, benefited by such treatment? Is it certain that such improvement as follows is a result of the structural correction per se, and not due to psychological, reflex, and other influences? Were the diagnoses of the cases which were treated accurately established? Is the benefit thought to accrue from the treatment measurable by objective or instrumental procedure or is it claimed on the basis of reports of subjective sensations? Is the amount of benefit derived from the corrective osteopathic treatment sufficient to justify the time and effort required? Is it sufficiently important in enough cases, as a factor in the health of the community, to justify the maintenance of a separate school of practice? Legislators and government representatives have asked such questions. Insurance companies and educators and possible philanthropic benefactors and potential patients and young graduates who are puzzled by the problems they face in practice ask them. Our senior students, if you have their confidence, often bluntly state "we know that the theory is good and we think the treatment is beneficial; but has the profession any scientific evidence of what is accomplished clinically?" Today there is a certain segment of the profession composed of earnest honest men so disillusioned because of the paucity of available answers to such questions as these, combined with their own lack of successful personal experiences, that their loyalty to the osteopathic profession is grievously weakened.

As a profession we honestly assume that our special treatment has been of great value in dealing with a large variety of critically ill patients. Those of us who have practiced long enough to acquire osteopathic skill have personally observed results in individual cases that would astound the old-school physician if he would admit the evidence of his senses. But of what weight, with critical young doctors, are the claims of a few thousand osteopathic physicians as individuals, based upon remembered episodes without adequate written records, in comparison with the combined opinion of 200,000 allopathic physicians and thousands more of their academic scientific satellites with documented findings of presumed benefit? Demonstrating the soundness of the scientific principles underlying osteopathy does not bring the acceptance of our clinical claims by educated scientists, as indicated by McCaughan[18] and so clearly illustrated in the episode related by Korr[19]. Nor is it of any deep concern, except from a public relations standpoint, that we have trouble convincing the scientific world. It is the doubt in the minds of the members of our own profession, especially recent graduates, that may threaten the continued practice of the distinctive concept of osteopathy. The thinking of doctors who have graduated in recent years is dominated by the emphasis placed upon the physical sciences in their basic education.[20] They are skeptical of ideas which they cannot reconcile with their knowledge of these sciences and tend, at first, to accept, even a little gullibly, methods that seem to be based upon new, constantly changing scientific theories. But, paradoxically, the mere scientific rationalization does not satisfy them for long. They expect, in addition, reports of the systematic study of the results in cases treated by the method.

Many members of the osteopathic profession are totally unfamiliar with the large number of good clinical reports and experimental observations that have been published over the years in our professional journals. Nearly 40 years ago the late Lillian Whiting[21] published a very satisfactory analysis of 223 cases showing the effect of osteopathic treatment on the progress of labor in obstetrical cases. Wayne Dooley[22] recently published a similar report on a group of 500. Dr. Whiting's files containing 1900 case records suitable for study are now being subjected to analysis by her daughter, Lillian Whiting Berlier, and Louisa Burns. Some results have already been published.[23] Ryel[24] brought about the collection of the records of over 1,000 cases which have in part been published, showing the relation of spinal injury in children to behavior problems, enuresis, chronic headache, et cetera. Riley[25] collected and reviewed reports of 1524 cases of Armed Forces personnel who sought private osteopathic care. Muncie[26] presented an excellent summary of the treatment of 100 cases of deafness. Garfield[27] reported 80 cases of influenza. Northup[28] published a series of observations on the treatment of high blood pressure. Scores of such references could be cited. But most of this material was published years ago and does not meet present-day requirements for presentation. From the standpoint of assessing the values of specific osteopathic treatment, it is not that creditable work has not been done by members of the profession but that it has not been recorded, collected, and analyzed and published in acceptable form. Unless this is accomplished, we cannot expect continued and increasing public support or the allegiance of our own more critical younger members.

Individual members of the osteopathic profession, however, must not feel that criticism is being leveled at them for dereliction of duty in failure to furnish such studies which we so badly need. "It would be utterly unjust," says W. W. C. Topley,[29] "to charge consulting physicians or surgeons or general practitioners with any negligence in not devoting more of their time to the advancement of clinical knowledge. They are not paid to advance knowledge. They are paid to look after their patients . . . . We certainly shall not get active and sustained research as a casual by-product of a busy professional life."

Our problem of clinical investigation is far more difficult from a scientific standpoint than that of the allopathic profession, because our procedures are so difficult to standardize. In specific manipulative treatment we must correct what is found anatomically disturbed in the individual patient and patients cannot very well be standardized. In spite of this, far more accuracy is possible in our studies than we have usually believed and it is possible to set up significant methods of inquiry. Our most serious obstacle in securing an acceptable evaluation of our particular agency in therapy is basically the same as that faced by the allopathic profession: That of getting enough cooperating members in the profession to understand how a true answer can be secured and why this study must be done in a certain way.

The details of proper procedure in clinical investigation are more adequately presented elsewhere,[30,31] but these are the essentials:

1. The cases utilized for study must be appropriately selected. Cases should be chosen of a type that can conceivably be caused predominately by osteopathic lesions. The allopathic scientist would not waste time investigating the value of penicillin by studying the treatment of a group of patients with broken arms.

2. The patient's clinical condition must be accurately studied and his state described before beginning treatments. Degrees of departure from normal must be measured, using, as exclusively as possible, objective means. J. S. Denslow and I. M. Korr are at present working on the problem of applying instrumental methods in the diagnosis of osteopathic spinal deviations.

3. Acceptable control measures must be provided, with especial attention to psychological factors and the "natural history" of the disease studied.

4. A definite treatment program must be planned and conformed to.

5. When the patient has been subjected to the program of treatment chosen his condition must again be studied and findings recorded in the same manner as was done before treatment began.

6. The information secured must be compiled and analyzed by methods that conform to sound statistical principles.

All this can be done if the necessary organization is provided and financial support given. It will yield us definite and dependable measures of the worth of osteopathy's particular method in treatment. It will not only determine how valuable our procedures may be but will help us to improve them. Because laboratory science research is so popularly esteemed today and because it may provide us with objective methods of instrumental study which will enable us to scrutinize our concepts more effectively, such research is also indispensable. But it is only a means to an end. Clinical research, I am convinced, is the final step necessary to establish and to insure preservation of the contribution that Andrew Taylor Still brought to the philosophy and art of healing.

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THE GOLDEN GATE OF MEDICINE

We must fend for the future of medicine by protecting its freedom to change and grow. There is no surer way of seeing the potentialities of a given subject than to examine its relation to all that is *not* it, but around it. It is an extension, not a negation, of clinical medicine to explore its own outside relations; the relations, for example, of somatic and organic disease to the findings of psychologists, sociologists, and geneticists. Not only is there an interior milieu for the body, but socially an exterior, and genetically an anterior, milieu. So frequently have we contrasted the individual with the mass that the word "individual" has come to have the connotation of isolation or separation. But the essence of individuality is the uniqueness of the individual's ties to his environment, and the indivisible cohesion or inseparability of these ties. Surely that idea alone points to a gateway outward on uncharted seas and to a variety of new lands.—Alan Gregg, M.D., *Annals of Internal Medicine,* April, 1949.

Cranial Reinforcements From a Manipulative Standpoint*

Articulations—Stress Bands—Buttresses

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Being born is a severe experience for the human mechanism and the trauma of this event leaves its telltale marks in varying degrees upon the individual.

In the 9 months of prenatal life there is a greater ratio of all growth than in several times that period in postnatal life. The system least developed at birth is the cerebrospinal, the human creature being the most helpless of newborns and very much at the mercy of those in whose care it finds itself. This cerebrospinal system is housed in the craniovertebral cavity, a very immature structure at the time of birth.

There are many factors contributory to birth injuries a long while before delivery—heredity, the health and habits of the mother—rendering the full term fetus more or less ready for the ordeal of delivery. Certainly some full-term infants are far less able than others to endure this ordeal and to overcome its effects fully.

Also for consideration there are the mechanical integrity of the mother, her own cranial pattern with its effect upon the pituitary and the resulting balance or imbalance of endocrine hormones with the general effect on body chemistry; various spinal lesions with their effect on blood and nerve supply to the uterus and adnexa; the various developmental changes of the spine and pelvic pattern—the bony support to structures cradling the growing fetus and also changes in the pattern of the bony birth canal. Each of these factors in itself constitutes a topic for an entire paper. This paper deals with some experiences of the fetus and newborn and possibilities of damage to the cerebrospinal system.

Little past the first 3 weeks of embryonic life the neural tube presents at its rostral, and more rapidly growing end, the three primary vesicles of the brain which constitute the future forebrain, midbrain, and hindbrain. By the sixth week there are five well-marked regional divisions of the brain. The mesoderm from which is derived the neurocranium, the protective case of the brain, is at first arranged about the developing neural tube as a membrane, the meninx primavita.

This confining membrane of the developing encephalon divides into an inner layer, the endomeninx, and an outer layer, the ectomeninx.[1] According to Hamilton[1] about the time the choroid plexus begins the secretion of cerebrospinal fluid the endomeninx separates into the pia mater, which very closely covers the brain, dipping into all its fissures as the various convolutions develop, and the arachnoid, which bridges all these indentations, providing space for the cerebrospinal fluid. The ectomeninx, which remains the supporting structure to the brain in its developing and mature states, divides into an inner layer, which becomes the dura mater, and an outer superficial layer, the membrane in which is developed the bony structure. In the early days of his cranial teaching William G. Sutherland spoke of the dura mater and the "dura pater." The development and interrelation of structures derived from the division of the meninx primavita should be kept clearly in mind.

The encephalon changes very rapidly. The cerebral vesicles of the telencephalon, which will form the cerebral hemispheres, grow at first anteriorly and because of the confining membranes the growth is soon directed superiorly and posteriorly. The medial surface of these rapidly growing cerebral hemispheres soon face each other but are separated by mesenchymal tissue which will later form the falx cerebri. The development of the cerebral hemispheres continues until their caudal extremities overlap the cerebellum, from which they are separated by a condensation of mesenchyme which will form the tentorium cerebelli. These dural reduplications are distinct by 8 weeks. In the continued growth of these hemispheres are noticed lateral depressions which will form the insula caudal to which the growth continues inferiorly and anteriorly in the formation of the temporal lobes. At birth these lobes are really little more than well defined. The opercula have just been well started and the larger convolutions are organized. The greatest development of the neopallium is a postnatal occurrence.

By the fourth week the notochord is well developed.[2] This is an axially placed fibrocellular supporting group of cells, closely associated with the general mass of mesoderm and directly ventral to the developing nervous system.

The cephalic end of the notochord, which at this time is in contact with the infundibular process formed in the floor of the diencephalon, undergoes regression as the blind tip of Rathke's pouch elongates and becomes closely applied to the infundibular process at about the sixth week. Toward the end of the second month the mesenchymal primordium of the base of the skull surrounds the remains of the notochord as far back as the beginning of the spinal column. The centrum of each vertebral body is formed about the notochord and so also is the basilar part of the occiput and the body of the sphenoid, though at the sphenobasilar symphysis the notochordal area, instead of being centrally placed, is almost ventral. Thus the earliest indication of skull formation is the concentration of mesenchyme around the area of the notochord and with the rostral extension of this concentration is formed the supporting floor for the developing brain.

As the confining membranes direct to a considerable degree the manner of growth of the developing brain so does the growth of the brain have its effect upon the developing bony cranium. According to Murray[3] ossification takes place first at the areas of greatest pressure.

Sergi[4] describes in careful detail the trabeculae of the bony meshes developing in the connective tissue of the membranous neurocranium. These meshes close eventually in definite directions resulting in composite bone. In the frontal bones this process begins at the lateral sides nearest to the musculus supraorbitalis, the first tissue in this area to become compact. Therefore, at this lateral area there is pressure or resistance externally while internally there will be pressure due to

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the rapidly growing cerebral vesicles, and as early as the second month the first bony trabeculae appear in the lateral part of the frontal bones.

The principal meshes and the accessory meshes unite and converge in a central point of the bone in formation; this point becomes the center of attraction developing a greater consistency and resistance and bending like a cone as the lateral parts tend to expand and dilate.

The frontals, parietals, and occiput, in their early stages of development, are so slightly convex that they are almost flat bones. The convexity, however, increases as the eminences of these five bones form after the third month and reach the maximum at about the seventh month. The cranium at this stage presents the pentagonal form which is transitory. The initial parietal eminences persist in the ellipso-ovoidal form of the cranium from the seventh month until birth and in extrauterine life the cranial bones again develop a convexity. According to Sergi[4] the persistence of any phase of the pentagonal form in the adult skull is a fetal residue due to incomplete development of the cranium.

The endomeninx surrounding the cerebral hemispheres is not chondrified as is the brain-enveloping capsule below this area; therefore, both endochrondral and endomembranous ossification centers are developed. An important point of cranial significance is the attachment of the tentorium to the inside of the skull where the bones laid in cartilage give way to those laid in membrane.

At the time of delivery the base of the skull consists of several portions of bones and the vault consists of very thin bones separated by membranous sutures and thus offers very little protection to the encephalon. As the number of cranial bones decreases as the vertebrate scale is ascended, so do the number of portions of cranial bones in the human decrease in the stages leading to maturity. Very many human difficulties arise because of interference during these stages of development.

The cranial dural membranes are at this stage ascribed the function of protecting the developing brain. Their complicated structure has been alluded to by various writers in previous years and certain phases described by a few. These membranes are a very important part of the osteopathic cranial concept as given to the osteopathic profession by Sutherland.[5] Though in literature there is frequent mention of the dural membranes there is surprising paucity of data concerning their embryologic and histologic development as compared with the wealth of such material concerning other phases of the human mechanism. A great deal of time and effort is being expended in the cranial research projects being carried out in the Philadelphia College of Osteopathy to further understanding of the mechanics allowed and produced by these membranes.

The cranial dura consists of two layers, the outer of which serves as the periostium of the inner surface of the cranial bones and is connected by the sutural ligaments to the pericranium. In the adult skull these membranes are easily removed from the bony vault except at the sutures. They are firmly attached at the base and extremely firmly attached to certain areas such as the crista galli of the ethmoid, the sphenoidal and petrous ridges, and the margins of the dorsum sellae, the basilar groove, and the foramen magnum. In the skull of the infant it is extremely difficult to separate any of the developing bones from these membranes.

The inner layer of the cranial dura is smooth; it surrounds the pia-arachnoid-encased brain and gives off four reduplications, one function of which has been described as holding the contents of the cranium in place and another as permitting movement of one part of the brain upon another. The largest of these reduplications is the falx cerebri, a sickle-shaped membrane in the longitudinal fissure separating the cerebral hemispheres. Its curved superior border is attached to the midline of the skull from the foramen cecum along the frontal crest to each lip of the sagittal sulcus as far posteriorly as the internal occipital protuberance. In the entire extent of this attachment the two layers of the falx are separated to assist in the formation of the walls of the superior sagittal sinus. The inferior border of the falx cerebri may be considered in three portions. There is an extremely firm narrow anterior attachment to the crista galli of the ethmoid bone. Posterior to this is a concave free border which lies above the corpus callosum and carries the inferior sagittal sinus. The third portion of this inferior border is its wide attachment to the summit of the tentorium. This area, one of great reinforcement, is known as the white line and its dural layers enclose the straight sinus into the anterior end of which flow the inferior sagittal sinus and the vein of Galen.

The tentorium cerebelli separates the cerebral hemispheres from the cerebellum and conforms to the upper surface of the latter structure. It is attached to the inside of the cranium around the level at which the bones formed in cartilage give way to those formed in membrane and it roofs the posterior cranial fossa. Its free margin which forms a pointed arch encircling the midbrain is known as the tentorial incisura. Its posterior semicircular border, enclosing the lateral sinuses, is attached to the margins of the transverse sulcus of the occiput and laterally the upper and lower layers of the tentorium attach respectively to the parietals and mastoid portion of the temporal bones. Thus the lateral sinus before leaving the tentorium lies astride the parietomastoid suture. Then, known as the sigmoid sinus, it descends in a deep groove on the mastoid portion of the temporal bone and turns anteromedially across the anterior or inferior limb of the occipitomastoid suture over the jugular process of the occipital bone to its exit from the skull through the jugular foramen. Upon the knowledge of these anatomic structures is based the osteopathic understanding of some of the causes of headache. Anteriorly the tentorium is attached on either side to the superior ridge of the petrous portion of the temporal bone, enclosing the superior petrosal sinus as it runs posteriorly lateralward from the cavernous sinus to the transverse sinus. Fibers of the free end of the attached borders cross and attach respectively to the anterior and posterior clinoid processes, completing the oculomotor triangle. This is another point of cranial significance, not only because of the cranial nerves but also because it constitutes a means of directing manipulative treatment to the hypophysis and the hypothalamus.

The diaphragma sellae, leaving an opening for the passage of the infundibulum, roofs the sella turcica and is also attached to the anterior and posterior clinoid processes.

The falx cerebelli is a small triangular reduplication attached posteriorly to the occipital crest and

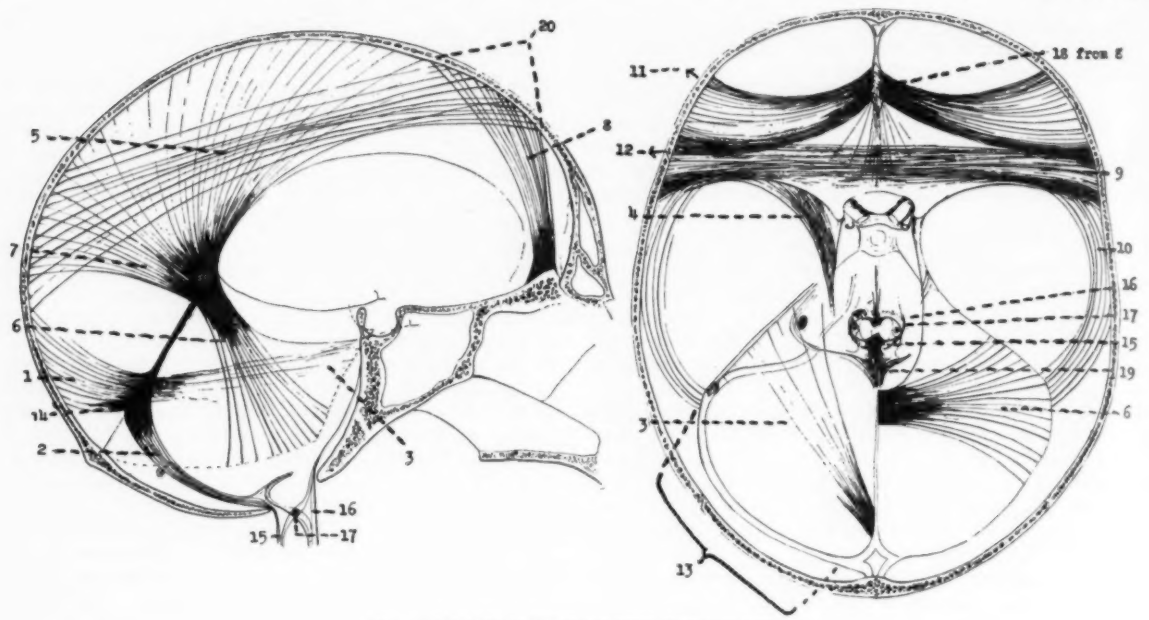

FIG. 1.—STRESS FIBERS OF THE DURA MATER

HORIZONTAL

1. Falx cerebri inferior } —from torcular mass
2. Falx cerebelli—tripod—19 }
3. Tentorium
4. Sphenoidal
5. Falx cerebri superior

VERTICAL

6. Tentorium
7. Falx cerebri posterior
8. Falx cerebri anterior—crista galli tripod—18

TRANSVERSE—9

CIRCULAR

10. Squamosal
11. Vault { anterior, middle, posterior } from metopic area—20
12.
13.
14. Posterior fossa or cerebellar—from torcular mass

SPINAL

15. Posterior—tripod } 17 { lateral fibers intersect
16. Anterior—tripod } { around vertebral artery

superiorly to the under surface of the posterior part of the white line and its anterior free concave border dips between the cerebellar hemispheres.

In order to understand the manner in which the membranes described above protect the brain from injury during delivery it is necessary to understand their general construction in a little more detail. There are white fibrous strands, known as stress fibers, throughout the otherwise yellow elastic tissue. It is a thorough understanding of this fact that enables us to treat successfully the newborn infants in serious need of immediate attention. These stress fibers which follow a very definitely consistent pattern, are arranged in horizontal, vertical, transverse, circular, and spinal groups.

From the torcular mass about the confluence of the sinuses there are four diverging groups of *horizontal fibers*. One group passes superiorly and posteriorly in the falx cerebri about the posterior part of the superior sagittal sinus. Another very strong group continues anteriorly and inferiorly in the falx cerebelli and ends in a tripod, the middle group of which mingles with the middle group of the posterior spinal tripod. Each lateral group of the cerebelli fibers passes around the foramen magnum on its respective side, crosses the jugular foramen anterior to the exit of the sigmoid sinus and posterior to the exit of the ninth, tenth, and eleventh cranial nerves.

These fibers continue posteriorly to and above the internal acoustic meatus. Some of these fibers along the petrous ridge mingle with the lateral fibers of the horizontal group of the tentorium, thus completing some of the circles of the posterior cranial fossa. The most medial fibers, after helping to form the lower border of the opening to Meckel's cavity, a very important point in dealing with tic douloureux, continue with those fibers of the free border of the tentorium giving an almost rope-like strength to this border as it attaches to the anterior clinoid process. Some fibers cross the diaphragma sellae, but the greater number continue anteriorly in the sphenoidal stress group in the lateral wall of the cavernous sinus. The most lateral of these continue laterally over the floor of the middle cranial fossa mingling with the posterior of the middle group of the vault circular fibers. The rest of the sphenoidal group diverge anteriorly, attaching to the upper and lower borders of the superior orbital fissure.

The tensity of these fibers greatly influences the cavernous sinus, thus affecting the enclosed part of the internal carotid artery which medially may crowd the pituitary as it rides the fluctuations of the cerebrospinal fluid within its fossa. In either side of the under layer of the tentorium a horizontal group of fibers diverges from the torcular mass to the petrous ridge, the most medial fibers contributing to the straight part of the tentorial notch.

The superior horizontal group of the falx cerebri extends in each of its layers from about the metopic point to a larger area about the lambda. The most

inferior fibers of this group mingle with the superior terminals of the inferior falx horizontal group.

Vertical fibers converge on each side in the upper layer of the tentorium from its lateral angle, that is from the anterior part of the lateral sinus and the lateral part of the superior petrosal sinus to the anterior one fifth of the white line from whence fibers diverge to the middle two thirds of the superior attached border of each side of the falx cerebri, here mingling with various crisscross reinforcements and certain of the vault fibers. Laterally the vertical fibers mingle respectively with those of the squamosal and the middle and posterior vault circular groups.

There is a smaller but very important anterior group of vertical falx fibers from about the metopic point which intermingles with the anterior end of the superior falx horizontal group and descends anteriorly to attach very firmly to the crista galli of the ethmoid where the fibers divide into three groups which form another very important tripod.

The *transverse fibers* extend across the posterior part of the anterior cranial fossa; the middle fibers continue with the middle fibers of the vault circular group while its posterior fibers consist largely of the lateral continuation of the sphenoidal group and its anterior fibers are principally a continuation of the lateral groups of the crista galli tripod.

The *circular fibers* of the vault start in the same area about the metopic point as do the anterior vertical falx fibers and the superior horizontal falx fibers. This region, common to six groups of fibers on each side, extending in the sagittal plane from a variable distance anterior and posterior to the metopic point, constitutes the metopic area. From this area the circular vault fibers descend laterally in three groups. The anterior group descends to the zygomatic angle of the frontal. The middle group descends to the transverse group, completing a circle that intersects laterally a circle formed in the bony cranium by the transverse buttress continuing with that of the coronal suture. The posterior group of the vault circular fibers is the largest and in the infant skull it is upon these fibers that the parietals float.

In the premature head, too small for forceps that slip upon the parietal tuber, it is this posterior group which becomes twisted and produces such perplexing confusion. For this reason we need to visualize clearly the circles which this posterior group helps to form. Arching posteriorly lateralward these fibers mingle with the vertical group about the transverse sinus and continue to the white line, some mingling with the fibers of the posterior falx vertical group and thus returning to the metopic area; others mingle with the inferior falx horizontal group, and still others with fibers of the same circular group. What tremendous support has each cerebral hemisphere, and by distortion of these supports, how that growing structure may be crowded!

There is a complicated interrelation between these various groups of fibers in the two layers of the tentorium. This is just a glimpse within the doors so simply thought of as stabilizing the dural membranes or normalizing or equalizing the tensities of the dura, a glimpse that at first may be hazy, but becomes clear with a little understanding which is greatly helped by actually seeing and feeling these structures in the anatomical laboratory. As A. T. Still[6] said, that which can be demonstrated, seen, and felt is a truth.

Very important are the *spinal stress bands*—anterior and posterior—which intermingle with each other caudally throughout the extent of the sacral canal and end about the foramen magnum in their respective tripods, the lateral groups of each intersecting about the vertebral arteries. Increased tensity in the latter area constitutes another osteopathic cause for interference with blood supply from heart to brain.

For descriptive purposes and for convenience in planning and organizing treatment, the fibers have been presented as above, but neither do they begin nor end; rather they continue in never-ending circles and forceful tripods designed for greatest strength.

In the bony structure also there are developed areas of greater density known as buttresses. Although this stage of development is not reached in infancy, the buttresses will be described here since by understanding their normal or expected positions, slight deviations in the infant skull which may result in gross abnormalities are more easily recognized.

The *anterior buttress* extends horizontally across the glabella laterally on each side over the supraorbital ridges to the zygomatic process of the frontal bone. The *posterior buttress* extends from the inion over the superior nuchal lines on either side to the mastoid process.

The *superior buttress* is the strengthened arc extending superiorly and forward from the inion for a moderately fair width over the sagittal suture, the frontal crest, and glabella. Curving posteriorly, it ends in the crista galli of the ethmoid bone. The *inferior buttress* may be considered as a posterior continuation of the superior buttress. It continues inferiorly and anteriorly from the inion to the opisthion where it divides, encircling the foramen magnum. Rejoining at the basion, it continues through the basilar portion of the occiput as far forward as the posterior wall of the sphenoidal sinus. For the purpose of treatment the superior and inferior buttresses together are often referred to as the *median sagittal buttress*.

The *lateral oval buttress* begins on either side at the mastoid process extending posterior to and above the external acoustic meatus to the articular process anterior to the mandibular fossa where it divides into two rami. The inner ramus joins the *pterygoid pillar of the face* which extends from the tip of the pterygoid process to the lesser wing of the sphenoid. Supported by the upper extremities of these pillars is the *transverse buttress of the skull*, the posterior margin of which is the sphenoidal ridge. The outer ramus of the oval buttress follows the zygomatic arch and joins the zygomatic pillar of the face, the arc of increased density extending from the ridge of the first molar through the zygomatic bone to the zygomatic process of the frontal.

The *oblique basilar buttresses* are formed by the petrous ridges of the temporals. They converge anteriorly toward the sphenoidal sinus, the roof of which forms the floor of the sella turcica.

The various buttresses may be pictured as radiating from about the sella turcica and in a manner similar to the stress bands of the reciprocal tension membranes. As the stress bands within the membranes continue in never-ending circles of amazingly elaborate but consistent patterns, so do the buttresses and pillars of the head and face present a continuously intermingling series of strengthening arcs, circles, and tripods. Together these strengthening, reinforcing, or

FIG. 2.—CRANIAL BUTTRESSES

denser areas in both the dural membranes and the bony structures form a continuation of arcs and circles to direct the various forces through and about the cranium and its contents.

In considering some of these pathways for transmission of forces, let us start in the anterior cranial fossa and note that its floor is supported by the anterior vertical fibers of the falx, suspended, as it were, in the sagittal plane from about the metopic area in the anterior part of the superior buttress. Anteriorly this fossa is bordered by the anterior buttress crossing the superior buttress at the glabella. From the extremities of the anterior buttress strengthening areas converge posteriorly over the frontosphenoid articulations to the anterior clinoid processes, which give the very strong anterior attachment to the fibers of the free margin of the tentorium. Along these fibers the strengthening force continues to the torcular mass at the posterior extremity of the superior buttress.

Other radiations from this torcular point are the inferior buttress, each arc of the posterior buttress, the white line, the remaining fibers of the horizontal groups of the tentorium, and the cerebellar circular fibers. The latter two, together with the lateral fibers of the cerebelli group, add their supporting and controlling resistance to the oblique basilar buttresses. These combined forces are carried superiorly through the posterior clinoid processes, the fibers in the diaphragma sellae, and the upper sphenoidal fibers to the transverse group of fibers and transverse buttress and inferiorly over the junction of great wings and body of the sphenoid to the medial supporting area of the pterygoid pillar of the face. Great strength and protection are thus given to the support of the pituitary body.

Further interrelation between the stresses of the dura mater and "dura pater" in the anterior part of the skull may be followed from the metopic area through the middle group of the vault circular fibers, laterally on either side to continue with the transverse group, thus completing a very powerful circular band. In each layer of the falx cerebri the anterior fibers of its posterior and greater vertical group reach the metopic area. Over these, forces may be continued through the anterior part of the white line and laterally through the tentorial vertical fibers to about the area of the lateral sinus at the common point of posterior, lateral, and oblique basilar buttresses. From that point the forces may be directed anteriorly through the squamosal fibers, a great number of which continue with fibers of the transverse group while others continue with the middle vault circular group.

The most convenient way to consider the termination and blending of these various groups is to visualize their very consistent fanning through which more circles are completed. The anterior vertical falx fibers which are very firmly attached to the crista galli, the anterior termination of the superior buttress, fan into a tripod, the middle and smallest group of which continue posteriorly, mingling with fibers of the layers of the transverse group. The lateral and stronger divisions sweep laterally, blending into the anterior part of the transverse group. Continuing laterally they mingle with those of the middle group of the falx circular fibers.

The diagonal crossing of reinforcements between bone and membranes in the area of the orbital plate may be considered comparable to that of the vertical and horizontal fibers in the tentorium and is very important in the treatment of the newborn with difficulties caused by face presentation. A few of the anterior fibers of the lateral group of the crista galli tripod complete the circle with the anterior vault circular fibers which come from the metopic area to the zygomatic angle of the frontal or the common point of the anterior buttress, zygomatic pillar, and the zygomaticoclinoid buttress.

For effective application of osteopathic cranial treatment to the newborn the physician needs to be thoroughly familiar with the positions, planes, and movements of the mature cranial sutures. In the adult skull the bony sutures, with their various bevels and planes, protect the contents of the cranium from undue trauma when unskilled, learning fingers attempt to direct forces through the stress bands. In treatment of the newborn cranium the knowledge of the stress bands is essential because the vault bones are floating in membranes and the basilar bones are more snugly nestled in cartilage and nowhere are found articulating bony sutures.

It is very easy to superimpose knowledge of the stress bands upon the basis of a thorough understanding of the possible movements, physiologic and compensatory, of the bony structure of the cranium. It is also easy to utilize this knowledge in treatment. Once this process is thoroughly mastered, the use of buttresses to direct forces in a more understandingly controlled manner will be facilitated. The controlled utilization of forces makes it possible to correct both bony and membranous cranial lesions, thus normaliz-

ing the entire structure and permitting unrestricted rhythmical and balanced fluctuation of the cerebrospinal fluid throughout the cisterns.

The importance of the dural membranes and their stress bands during labor and delivery has been described in obstetrical articles. According to Holland some group of stress fibers is under strain in each stage of delivery.[7]

Let us follow the development of the cranial pattern through the latter months of pregnancy. The inclination of the fetal spine and craniovertebral junction is dependent upon the position of the fetus in relation to the placenta, lumbar spine, and pelvis of the mother. In every uterine contraction, many of them unfelt by the mother, force will be transmitted through the fetal spine more against one condylar part than the other or more anteriorly on one side than on the other. This builds up a tensity responsible for the development of the cranial asymmetry which may be observed in infants delivered by cesarean section performed before the onset of labor. At times rather excessive moulding may be demonstrated by roentgen study.

Up to this point there has developed what we speak of as the original "pattern" of that particular cranium. If nothing interferes with its growth areas, each bone will continue its growth to the fulfillment of the pattern of its scaffolding.

During labor the forces through the infant spine upon the base of its skull are increased and changed, depending upon the variations of the craniovertebral angulation during descent of the head and also upon the degree of synclitism of the presenting head. Disturbances of continuity of the circles of stress through the membranes occur as confusion is being produced in the base and may to a degree be contributory to increased confusion of that area. If one parietal becomes fixed, the forces as already described are greatest on the opposite side, and that condylar part is forced more cephalward and either anteriorly or posteriorly, dragging with it the lateral cerebellar fibers of the same side and thus beginning a disturbance of equilibrium of the membranes. If, instead of the occiput, the posterior part of the advancing parietal presents itself, the posterior vault circular fibers of that side will be strained, deflecting the white line toward that side. Great distortion is thus produced by the four groups of diverging fibers from the anterior part of the white line and their continuation with the circular groups and also of the diverging groups from the torcular mass, already disturbed by the cerebellar fibers.

The description by an obstetrician, having an understanding of these cranial principles, of the mechanics of the particular delivery resulting in badly aligned cranial parts has aided materially in understanding which groups of fibers have been overstrained and which may best be employed to produce sufficient correction or freedom for nature to continue the process of remoulding after the malaligned base has been returned to a more nearly normal pattern. It was very early observed that apparently complete correction often resulted in the reverse picture of the cranial pattern within a day or two, showing that too great strain had been placed on some membranes or, due to lack of understanding, the wrong group had been employed for correction.

It is very important to understand the forces that produce the moulding which is, in its proper proportions, a physiologic necessity for natural delivery. The cranium is reduced in size for passage through the birth canal by some of the cranial fluids being forced out of that cavity and by the overriding or moulding of the vault bones. If this overriding is excessive it cannot correct itself without help, and if membranes have been stretched beyond their point of elasticity, they will be unable to exert their corrective forces. Another very important consideration is that dural membranes at the time of delivery are still in the process of development. The reinforcing crisscross fibers of the superior sagittal sinus are not well formed although there are supporting threads running obliquely from one side to the other throughout this sinus which are not observed in the older specimens. Also in later life the vessels leading into the superior sagittal sinus are well protected, lying between well-formed layers of stress fibers. The posterior vessels of the vertex entering against the stream in a great degree of obliquity are found to have a greater amount of supporting tissue and it may be concluded that the more upward pressure is thus produced between the layers of stress fibers, during the respiratory movements, to carry the venous flow of these vessels into the superior sagittal sinus against the flow therein. The most anterior vessels, which themselves travel posteriorly to enter the superior sagittal sinus, have little supporting structure. Very scant supporting structure of these veins of the vertex is found in the newborn and thus it is easily understood that the tearing of these vessels by excessive moulding, as described in obstetrical literature, is another cause of intracranial hemorrhage.

The most common area of hemorrhage is at the junction of the vein of Galen and the straight sinus. Hemorrhage is most likely to occur when the angulation of this junction has been increased by the foreshortening of the horizontal fibers and consequent elevation of the vertical fibers, which may also cause a strain upon the cerebellar vessels entering the undersurface of the straight sinus.

It should also be remembered that confusion of the basilar bones and abnormal tensities in the membranes may be responsible for crowding the cerebellum low in the posterior cranial fossa and forcing the medulla against the basilar portion of the occiput, with disastrous potentialities.

Of great importance is the development of normal relationship between occiput and atlas. In addition to the confusion of the base of the skull, already described, corresponding confusion of the four developing parts of the atlas may exist. This confusion may indeed be intensified if the delivering head is locked in an asynclitic manner while forces from uterine contraction, transmitted through the entire spine, displace the atlas upon the occiput. This happens sometimes when the head is in further descent and the posterior shoulder slips further caudad in relation to the mother.

In conclusion it is well to remember that bony growth satisfies its scaffolding and cannot express itself beyond the established pattern. For the prevention of many human maladies dependent upon derangement of the central nervous system, derangement often due to restriction within the craniovertebral membranous and bony cavity, it would seem most advantageous to the helpless human newborn to be in the hands of an osteopathic physician trained to know the normal and hence able to recognize and reduce malalignment of the parts of the base of the skull and the resulting

membranous strains, thus freeing the craniosacral mechanism.

Though many cranial birth injuries produce immediate symptoms there are many more which produce manifestations later in life when the central nervous system has developed to the degree where such manifestations are possible. When searching for the cause, it is well to remember those structures housing the cerebrospinal system.

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The Immediate Clinical Results Following the Use of Chloromycetin in the Treatment of Chronic Brucellosis

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The management of chronic brucellosis has always been a difficult task for patient and physician as well. It has, as a rule, proved to be a condition from which the patient seldom died, but one with which he often died. Cure has been rare and control of the disease difficult and discouraging, with each remission in its course producing hope and each exacerbation a sense of failure.

In the past 2 years there have been six "cures" for brucellosis published in the lay press. The tendency of these publications to make a story sound good has resulted in the dissemination of partial truths and mitigated reports of failure and danger in these forms of treatment. Patients suffering from a chronic, often disabling disease of this nature take these reports as proved truths and come running to their physicians with the advent of each new "cure." Most physicians themselves are too eager to try each new method as soon as the first reports are released, often to the detriment of the patient. It is better, if possible, to wait until the probable course following treatment can be ascertained and patients advised accordingly. When they begin treatment with the belief that cure is to result, they expect nothing short of complete relief of symptoms, and when relief from symptoms fails, these patients, who are usually already emotionally unstable as a result of the constant or repeated liberation of toxin from the Brucella organisms in their bodies, suffer mentally from the new failure, and the treatment is actually a traumatic experience.

Even when a substance is obtained that will completely eradicate the organisms from the human body, many patients are not going to be completely symptom-free. In the first place, many of them have been sick too long to give up the "habit" of illness. A person who has suffered from a disease of this type for years considers a state of perfect health to be utopian. Secondly, those who have harbored the infection for years are apt to have a certain amount of damage to the organs, such as the liver, gallbladder, fallopian tubes, et cetera, which have long been the foci of infection in these individuals. Some symptoms are therefore likely to remain, at least for a time, in all cases except those that are very mild. The patient should understand this before treatment is begun, not later when he is apt to believe that the physician is covering up for partial failure.

Chloromycetin shows evidence that it is the first substance to be of any great value in these chronic cases. Other drugs and antibiotics have produced good results in early cases but have failed in the majority of cases of long duration. Chloromycetin is apparently nontoxic and produces no side effects to contraindicate its use. In my experience it has produced good results in 10 of the 15 cases in which it has been used. These good results include a few cases in which the patients report they are symptom-free and several cases that are markedly improved. It is my belief that these patients are not cured but at least in most cases will relapse sooner or later. For that reason I insist that they continue with vaccine therapy.

The important thing is that now, for the first time, some of these people may be rapidly improved when they relapse into a state that interferes with their activity or comfort. Up until now improvement was usually a gradual and uncertain process, often of long duration and was usually followed sooner or later by yet another relapse. These patients receiving chloromycetin have not been followed long enough to ascertain the duration of the improvement, but if it proves to be for several months in most cases and if it can then be repeated by another course of treatment, chloromycetin will indeed be a boon to these sufferers. It appears in our cases that improvement is either marked or does not occur at all. In most cases where improvement occurs it is noted early, as early as the third day of treatment, but it has not been apparent at times for 7 to 10 days after treatment has been completed.

All the patients in this series have had the disease diagnosed on the basis of the agglutination test, opsonic index, and skin test. None of them have had positive blood cultures. The majority of cases are of several months' or years' duration. Most of the patients have been on vaccine therapy and have elected to take chloromycetin because their response to vaccine treatment was so slow. Others were placed on chloromycetin because they were nearly or completely incapacitated. The fact that many of them have tried the previous "cures," or other spectacular or expensive forms of treatment, without success rules out the possibility of the improvement being psychological. It is not apparent to me why certain patients respond so well and others with similar symptoms and findings do so poorly. It is probably due to the difference in the location of the organisms in the body. In the future we may be able to work out combinations of

substances which will eliminate the organisms from the various parts of the body.

A few representative cases will be described. The dosage of chloromycetin was based on the initial dose of 60 mg. per kilogram of body weight followed by 250 mg. every 3 hours for a total of 30 grams. They would have probably done as well on a schedule of 0.5 gram every 6 hours.

The first case treated with chloromycetin was C. M., a 35 year-old female, who had had the disease at least 4 years, and during that time had had several forms of treatment including vaccine, streptomycin, sulfadiazine, blood transfusions, and aureomycin. This woman was practically incapacitated because of severe weakness, aching, and mental depression. She usually had a fever of 99 to 101 F. each afternoon. The patient was markedly sensitive to vaccine, getting a severe local reaction to even the most minute doses. The course of treatment with blood transfusions and sulfadiazine resulted in a decrease of symptoms for 4 weeks. Streptomycin produced no noticeable change though it was given in dosage considered adequate. Aureomycin was given only 7 days when it had to be discontinued because of the marked irritation of the gastrointestinal tract.

Chloromycetin was given without toxic reaction, other than a sense of numbness over the left zygomatic process which soon disappeared, and the patient reported a marked improvement in symptoms. Her remission was complicated by a sciatic pain which finally responded to a surgical removal of fibrous tissue around the nerve roots. Following her surgery the patient was injured in an automobile accident. In spite of these factors the symptoms due to the patient's chronic infection were practically eliminated for a period of 6 weeks. At the end of that time a gradual return of weakness, sweating and insomnia occurred. At present a second course of chloromycetin is being given to the patient.

C. Y., a 38 year-old female, R. T., a 39 year-old male, and R. S., a 24 year-old female, all responded in a like manner. They reported that symptomatic improvement was noted during the third or fourth day of treatment and that symptoms were relieved completely.

C. Y. is a physician's wife who has had the disease since childhood. She kept a diary during her period of treatment that was very revealing regarding the mild side effects caused by the chloromycetin or its action in her body. She reported diplopia the first day that was rather marked. After that the main things that she noticed were a bitter taste, frequent dropping of objects, and polyuria. Her word picture of her recovery from the distressing symptoms of pain, fatigue, and nervousness is that of a person being reborn. She relapsed to a degree, however, 4 months later.

R. T., a factory worker, had been ill for a year with lumbar ache, nervousness characterized by periods of shaking and crying, a weight loss of 20 pounds, and migrating joint pains. For 6 months he had been too ill to work and had spent his savings in doctors' offices. When the diagnosis of brucellosis was made, treatment with chloromycetin was begun. In this case a large dose was used initially, practically double the doses stated above and used in other cases. His symptomatic recovery was very rapid and complete, and he returned to work 10 days after completion of the chloromycetin therapy. He has remained symptom-free to date, a period of 22 weeks.

R. S. presents an interesting case from a different angle. She had not only mild brucellosis but multiple sclerosis for a period of approximately 18 months. The symptoms of multiple sclerosis had diminished during about a 9 month period in which vaccine therapy had been used. The patient then became pregnant and, since it was known that both of these diseases often become worse following childbirth, I decided to give her chloromycetin near the end of her pregnancy. This was done, and there has been complete recovery from the symptoms of both diseases, this recovery having been maintained for a period of 23 weeks. Unfortunately the patient is not available at this time for a neurological examination. I do not know if her reflexes and eyegrounds have changed or not. It is well known that multiple sclerosis is characterized by remissions, but they do not usually follow pregnancy. This is of interest because it adds support to the theory of Kyger and Hayden[1] that there may be a relationship between brucellosis and multiple sclerosis.

A few cases seemingly of like severity and duration failed to derive any benefit from chloromycetin. The severity of the symptoms seemed to have little bearing on the outcome of the treatment. I have seen success with patients who were completely incapacitated by the disease and in others to whom it was merely a nuisance. On the other hand, chloromycetin treatment has been a dismal failure in cases that were seemingly like some of our "prize cases." Harris[2] reports a series of 25 cases with 78.5 per cent making partial or complete recovery. Three, however, received more than one course of therapy.

Of great importance is the necessity of carrying on with vaccine, even after seemingly excellent results with chloromycetin. In cases which are newly diagnosed and in which vaccine therapy has not been used previously, it should be instituted immediately. The treatment of brucellosis cannot as yet be accomplished with the routine ease of management of gonorrhea. There still remains much symptomatic treatment of a medicinal, manipulative, and psychological nature that must be done. Cases of years' duration have organic changes in various foci that must not be neglected. These patients also have established various patterns of thinking and behavior, because of long association with this debilitating disease, that cannot be ignored, nor should it be left for the patient to attempt to find his own way out of the maze. Remember that these people are bewildered and have spent months or years and hundreds of dollars trying to get well. They deserve an explanation of the nature of the disease, how it involves the body, what it is likely to do to them, and what you hope to accomplish to help them. In short, these people need a true physician.

SUMMARY

It is pointed out that there is now a substance available that will produce symptomatic improvement in a large number of cases of brucellosis. Whether or not chloromycetin can be given again and again with equal effectiveness in the cases which relapse remains to be seen.

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Simplified Clinical Evaluation of Ocular Palsies

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Contrary to the consensus, the evaluation of ocular motor paralyses should usually be a simple matter. Unnecessary difficulty, however, often arises from conventionally published erroneous concepts of extraocular muscle action. These are based on a fallacious assumption that eye movements produced by given muscles are those *which would result from their solitary action on the eyeball in neutral position,* i. e., with gaze directed straight ahead. Since these are not the physiologic conditions under which the muscle pairs act, the implied actions are obscure or even misleading as diagnostic criteria and constitute an unfortunate source of confusion. This paper purposes to visualize graphically the cardinal extraocular muscle actions as an essentially simple basis for interpretation of these clinical problems.

ANATOMICAL BASIS OF EXTRAOCULAR MUSCLE ACTION

The action of the individual eye muscles is readily visualized and may be understood by reference to the accompanying diagrams.

The medial and lateral recti direct gaze medially and laterally (Fig. 1). Weakness of these muscles presents no diagnostic difficulties. However, diagnostic errors frequently arise from failure to consider that *the functions of the remaining extraocular muscles vary with the horizontal direction of gaze.*

The action of the superior and inferior recti is modified by the angle formed between their direction of pull (along the anterolaterally directed axis of the bony orbit) and the visual axis. *When gaze is directed laterally* vertical movements are produced almost entirely by this pair of muscles since this position aligns the visual axis with their direction of pull (Fig. 2). Contractions of the oblique muscles with the eye in this position would produce chiefly torsion of the eyeball rather than any vertical shift of gaze. As torsion is not a normal physiologic response with the head fixed as during examination, the action of the obliques may be considered negligible when gaze is directed laterally.

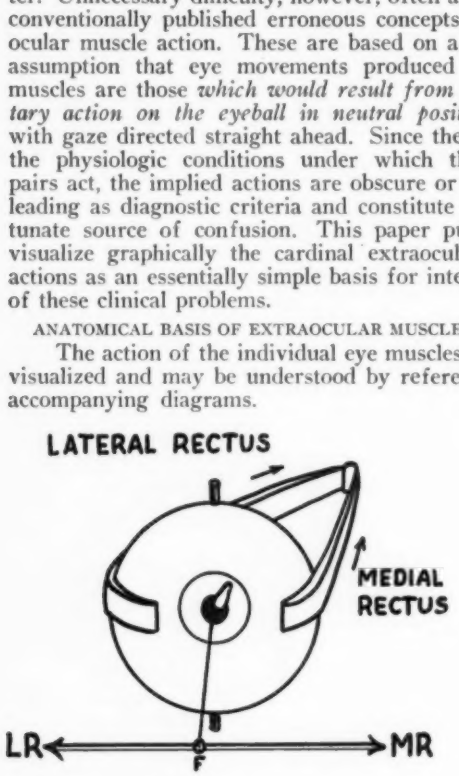

FIGURE 1.

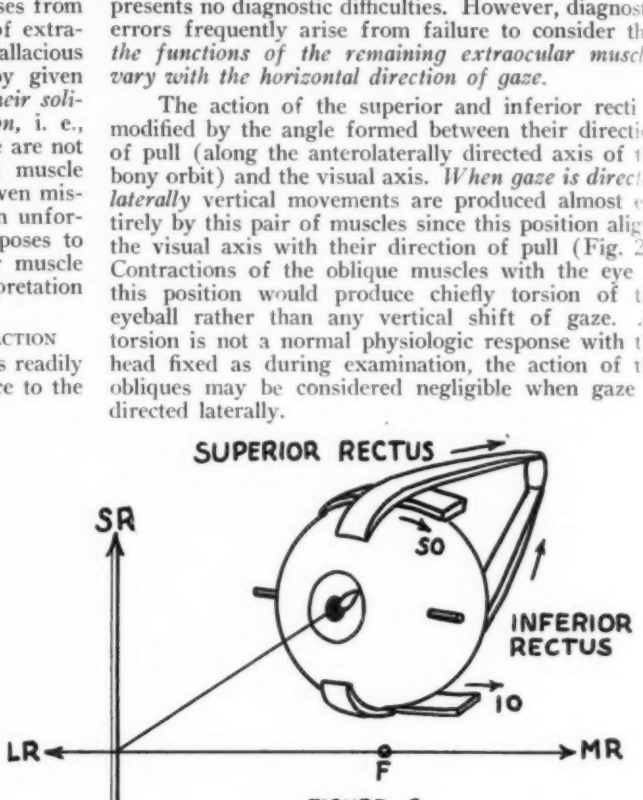

FIGURE 2.

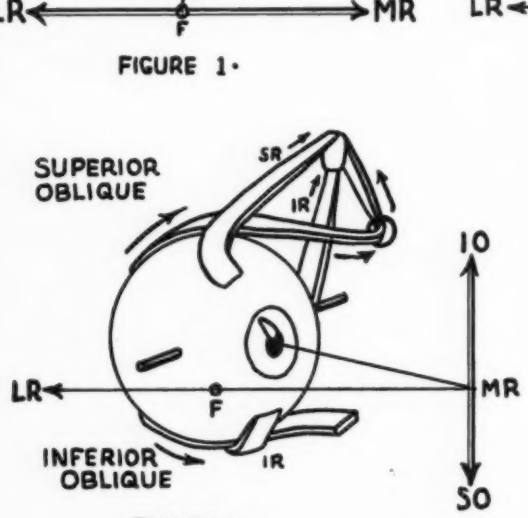

FIGURE 3.

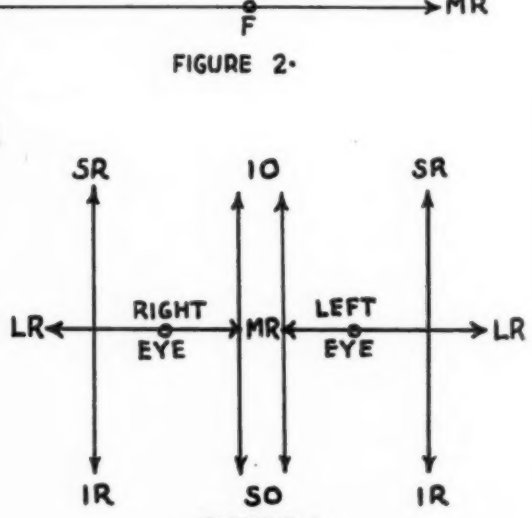

FIGURE 4.

Fig. 1. Horizontal movements laterally are a function of lateral rectus (LR), medially of the medial rectus (MR). Fixation point with eye in neutral position (F). Fig. 2. Vertical movements *with gaze directed laterally* are chiefly a function of superior rectus for upward movement (SR) and inferior rectus for downward movement (IR). Fig. 3. Vertical movements *with gaze directed medially* are chiefly a function of the oblique muscles. The superior oblique (SO) depresses while the inferior oblique (IO) elevates gaze. Diagrams are of right eye. Fig. 4. The movements indicated for the two eyes as seen from the front by the examiner isolate as nearly as possible the action of the individual extraocular muscles.

The oblique muscles insert behind the equator of the eyeball and act from actual or physiologic origins anterior to this plane. With the visual axis aligned as nearly as possible with the anteromedial direction of pull of the oblique muscles (by directing the gaze medially) contractions of the obliques become chiefly responsible for vertical eye movements (Fig. 3). The inferior oblique elevates gaze while the superior oblique lowers it. Theoretically, contraction of the superior or inferior rectus with the eyeball in this position would produce torsion. Since this is not a physiologic response under test conditions the action of this pair of recti may be considered negligible when gaze is directed medially.

With the eyeball in positions intermediate between laterally and medially directed gaze vertical movements will obviously be produced by the coordinated action of both superior rectus and inferior oblique for elevation of gaze and the inferior rectus and superior oblique for depression. However, in cases of faulty vertical movement the problem is to determine which particular muscle in a given pair is responsible. This is best accomplished by testing vertical movements at each extreme of horizontal gaze (i. e., with gaze directed medially, then laterally) since this tends to isolate the actions of individual muscles. Special studies of torsion effects (as variable tilting and displacement of the image from the retina of the involved eye produced by efforts to alter vertical levels of gaze) are possible with special equipment, but are not essential to the diagnosis of paralytic squints.

PLAN FOR EVALUATION OF OCULAR MUSCLE FUNCTION

Clinically then, the medial and lateral recti are tested by demonstration of their ability to direct the gaze medially and laterally. The superior and inferior recti may be tested by having the patient respectively elevate and depress gaze *with the particular eye directed laterally* (about 23°). The superior and inferior obliques may be tested by checking ability to respectively depress and elevate gaze *with the particular eye directed medially as far as possible.* During examination the head should remain fixed. Movements in the appropriate directions (Fig. 4) should be observed both with a moving object for the eyes to follow and upon verbal commands alone since this makes it possible to differentiate eye movements initiated reflexly (from the occipital cortex by the stimulus of the moving object in the visual field) from those initiated voluntarily (from the frontal cortical center for eye movements).

SUMMARY

A simplified basis for testing and evaluating extraocular muscle functions has been graphically visualized and described.

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Arterial Hypertension

An Approach to the Problem*

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While attempts at instrumental, nonbloody measurement of the arterial pressure in man date far back in medical history, it is only within the past 30 years that measurement of the blood pressure has become an integral part of the physical examination. Since then hypertensive disease and its consequences have become recognized as being among the most common conditions encountered by the physician. According to conservative estimates 8 to 10 per cent of the entire population under 45 years of age have hypertensive vascular disease and after 45 years of age, the incidence rises to 40 per cent of the entire population. As long ago as 1924 Fahr[1] calculated that 140,000 deaths in the United States were due to hypertension or its consequences, this number representing 23 per cent of all deaths in persons over 50 years of age.

In studying arterial hypertension it has constantly been borne in mind that the majority of the sufferers of this disease must be cared for by the general practitioner whose laboratory facilities are usually limited. Therefore, clinical methods have been stressed and extensive laboratory investigation has been avoided as much as possible in the writing of this paper.

It is my impression that terms such as "benign" and "malignant" when applied to hypertension are actually misnomers since the disease is never actually benign and sooner or later results in damage to the kidneys, heart, or brain. Likewise the term "essential" is misleading, since its original definition as that type of elevation in blood pressure essential to insure an adequate supply of blood to the various organs of the body in the presence of arteriosclerosis is no longer accepted. For the purposes of this paper these terms have been eliminated and the single term "hypertensive vascular disease" has been used for the syndrome in which the systolic and diastolic pressure is temporarily, continuously, or recurrently elevated.

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ETIOLOGY

The management of the patient with hypertensive vascular disease involves many factors of which a thorough understanding of the etiology and its accompanying physiologic mechanisms is a prime requisite.

Despite a century of investigation, the cause of hypertension is still unknown. Nevertheless a great deal of important information regarding its many causes has been acquired. One fundamental fact that appears to be definitely established is the inherited constitutional predisposition which has been exhaustively studied by Weitz[2] who concluded that hypertension is inherited as a dominant characteristic, but admitted that the dominance is not invariably demonstrable. Hines[3] likewise reported evidence that hypertension is inherited as a dominant characteristic. He found that a family history of hypertension is five times as frequent among hypertensives as among controls. Ayman[4] found that in families in which both parents had normal blood pressure, only 3.1 per cent of the children had high blood pressure, while the disease was present in 28.3 per cent of the children of families with one hypertensive parent and in 45.5 per cent of the children of two hypertensive parents. Most physicians are acquainted with families in which

the members are subject to "strokes." The more opportunity I have to study the families of sufferers from hypertension, the more convinced I am that most of them are predestined from birth.

There is no known single specific cause for hypertensive vascular disease. The disease may be initiated by a great many different factors. Page,[5] in 1939, listed forty-seven conditions causing or associated with hypertension, and there are probably many more which we do not as yet entirely recognize. Furthermore, it is not absolutely necessary for these causative factors to be present throughout the entire course of the disease, but merely to give the initial impetus—once started the hypertensive processes frequently continue.

Of the many causes of hypertensive vascular disease, certain ones stand out conspicuously because of their frequency in clinical practice. In my experience these causes can best be divided into four main groups, namely (1) uropathies, (2) cardiac disease, (3) metabolic and endocrine disorders, and (4) miscellaneous causes.

1. *The Uropathies.*—Since the work of Goldblatt,[6] Page,[7] and others, attention has been focused upon the kidneys as etiologic agents. These investigations of the mechanism through which constriction of the renal artery in the dog produces hypertension have rendered it highly probable that diminution in renal blood flow produces hypertension in human beings through the intermediacy of the secretion of a pressor substance into the blood by the ischemic kidney.

Study of the pathological anatomy in many of the individual diseases of the kidneys associated with hypertension reveals evidence of obstruction to the renal blood flow. In my experience, unilateral kidney disease, glomerulonephritis, nephrosclerosis, and polycystic kidney disease are encountered with sufficient frequency to justify clear elucidation. Unilateral obstructive lesions of the ureters such as kinked ureter, congenital vascular anomalies, and calculi have been of particular interest since Levy and others[8] have shown that ureteral ligation in dogs may cause pronounced diminution in renal blood flow and, consequently, hypertension. The invaluable aid of intravenous urography and the retrograde urogram in the diagnosis of these conditions and the dramatic improvement following removal of the cause have been particularly gratifying.

2. *Cardiac Disease.*—There are a few distinct cardiac conditions which, although not really related to the general problem of hypertensive vascular disease, produce or are accompanied by elevation in blood pressure. In my experience these conditions occur with sufficient frequency to merit mention. Coarctation of the aorta, a congenital vascular abnormality, is characterized by hypertension in the upper extremities and hypotension in the lower extremities. The elevation in blood pressure in this condition is due to the structural abnormality and is amenable to surgery.

As a result of the very slow heart rate that occurs in such conditions as aortic insufficiency and heart block, the systolic pressure is apt to rise and the diastolic to fall.

3. *Endocrine and Metabolic Disorders.*—The relationship of abnormalities in function of the endocrine glands to hypertension has been extensively investigated. These investigations have given the impression that such abnormalities can account for hypertension in selected cases. The cases of hypertension associated with menopause constitute a very considerable proportion of the total cases I see in private and dispensary practice. Such hypertension seems to be more common in women who have severe menopausal symptoms and a hereditary tendency to hypertension.

Albright's[9] measurements of the excretion of the prolan A in the urine indicate that the hot flushes of the menopause accompany increased production of this hormone, but they do not definitely prove that the two phenomena are connected. In my cases, the administration of large doses of estrogenic substance occasionally resulted in a fall in blood pressure, but generally no effect worthy of mention occurred. Mayer, Meranze and Israel[10] also reported little effect on hypertension from the injection of estrogens, which would seem to indicate that hypertension is not directly related to the loss of ovarian function. Even though the treatment with estrogenic substance has little effect on the blood pressure, it is of enormous symptomatic benefit in terms of alleviation of hot flushes, nervousness, headache, emotional instability, and other nervous symptoms easily confused with the symptoms of hypertension.

Plummer[11] showed that the systolic pressure is usually elevated but the diastolic pressure is normal or low in hyperthyroidism. However, it is not uncommon for patients with long-standing thyrotoxicosis, but without true hypertension at first, to develop hypertension at middle life. Hypertension in such individuals cannot be attributed directly to the thyrotoxicosis for very severe hyperthyroidism in the young, although present for years, does not produce elevation of the diastolic pressure. It has been my experience that in those cases of hyperthyroidism associated with hypertension the level of the blood pressure falls little, if any, after the basal metabolism is brought to normal. However, just as in the "climacteric hypertension," striking subjective improvement does occur.

In most cases of true myxedema there is a tendency toward lowering of the systolic pressure and elevation of the diastolic pressure with a resultant low pulse pressure. However, Fishberg,[12] in a survey of necropsies in myxedema, found that cardiac hypertrophy, granular kidneys, and severe arteriosclerosis were not uncommon. Here again there is no convincing evidence that the deficiency in thyroid secretion directly causes the hypertension, but it seems more probable that there is a complicated disturbance in the reciprocal relations with other organs of internal secretion and the vegetative nervous system that results in hypertension, though the exact mechanism is completely obscure. I have observed striking improvement clinically, with stabilization of both the systolic and diastolic pressure, after the basal metabolism was brought to normal in cases of hypothyroidism and myxedema.

It has been my observation that in health the blood pressure tends to rise with increasing weight and that elevation of both the systolic and diastolic pressure is a relatively common accompaniment of obesity. Robinson, Brucer, and Mass[13] studied blood pressure levels in relation to weight in 7,478 men and 3,405 women who were well or suffering only from minor complaints. Analysis of results revealed that systolic hypertension was almost three times and diastolic hypertension four and one half times as frequent in obese as in undernourished men, and that systolic and diastolic hypertension was six times as frequent in obese women.

I have observed that reduction in weight by dietary restriction is usually accompanied by considerable fall in blood pressure, providing permanent organic changes have not occurred. However, blood pressure usually rises again if the patient gains weight. It appears evident to me that the obesity in itself does not cause hypertension, for we have frequently encountered obese individuals with low blood pressure, but that obesity, like hypertension, is often an inherited characteristic and that the same constitutional type is predisposed to both.

Despite the high incidence of hypertension in diabetics reported by Joslin[14] and Kramer[15] (Joslin 33 per cent and Kramer 39 per cent), the fact that hypertension does not occur in young diabetics, even though they have had the disease in extremely severe form for years, shows that hypertension is not caused by diabetes. It is my impression that middle-aged and elderly diabetics are more apt to have hypertension than are those without diabetes. It furthermore seems probable that the constitutional disturbance which predisposes to hypertension is also related to diabetes. I have found hypertension, diabetes mellitus, and obesity to be a triad observed frequently in the same individual and not uncommonly in several members of the same family.

4. *Miscellaneous Group of Causes.*—Such conditions as adrenal tumors, Cushing syndrome, and the neurogenic and psychogenic factors in the production of hypertension, have been grouped together because of their relative infrequency in clinical practice.

The adrenal tumors fall into two groups: (1) tumors derived from the adrenal medulla or other chromaffin tissue, which are known as pheochromocytoma or paraganglioma, and (2) tumors derived from the adrenal cortex, usually carcinoma or adenoma.

The hypertension produced by the first group of tumors is supposedly due to the secretion and circulation of an excess of adrenalin and is, therefore, usually of the paroxysmal type. The hypertension accompanying the second group is usually associated with other constitutional manifestations such as pubertas praecox in children and the Cushing syndrome in adults. Oppenheimer and his associates[16] have shown that tumor of the adrenal cortex is the most common cause of the syndrome which Cushing originally attributed to basophilic adenoma of the pituitary.

Considering the long-known pressor effect of extracts of the posterior lobe of the pituitary gland, it is not surprising that they should have been investigated as a cause of hypertension. Cushing,[17] in his remarkable investigations of the adenoma of the pituitary gland, was the first to show that basophilic adenoma produced a clinical picture characterized by obesity of peculiar distribution, hirsutism, abdominal striae, skeletal decalcification, amenorrhea, glycosuria, and arterial hypertension. He attributed the elevation in blood pressure in this syndrome to an excess of neurohypophyseal secretion. Later he advocated the theory that the immediate mechanism of essential hypertension consists in the secretion and circulation of an excess of the pressor principle of the posterior lobe. This theory is very attractive and although there is not sufficient evidence to justify its complete acceptance, it certainly has not been completely disproved.

The neurogenic and psychogenic origin of hypertensive disease has many advocates and it is generally admitted that psychic factors play an important part in the production and maintenance of the disease. The early symptoms of hypertension are not unlike those of psychoneuroses and the relationship of emotional stress to the onset of hypertension and to the anxiety which is frequently responsible for the aggravation of existing hypertension is well known. It is my impression that in spite of the organic nature of experimental hypertension, the psyche has not been absolved as a factor in the etiology of hypertension.

DIAGNOSIS

Since a logical curative therapy must be based upon removal of cause, cognizance of the etiologic picture is essential to proper therapy. Obviously the first consideration should be accurate etiologic diagnosis. Many of the factors that have been mentioned are amenable to therapeutic correction; others are not.

An adequate diagnosis, however, must consider not only the cause of the disorder but also the extent of functional impairment. Since the clinical pattern produced will depend upon the severity, the localization, and the rate of evolution of the arteriolar damage, the diagnosis must also include both qualitative and quantitative evaluations. I have found it desirable to determine accurately the stage of the disease in each individual so that the prognosis and methods of therapeutic management can be more readily determined. As a guide in this direction patients are classified into one of three groups, e. g., early hypertensive vascular disease, moderately advanced hypertensive vascular disease, and advanced hypertensive vascular disease. These classifications are based upon examination of the retina, the heart, and the kidneys for evidence of arteriolar damage and not upon the degree of blood pressure deviation. The criteria for this clinical classification are:

1. *Early Hypertensive Disease.*—

a. Retina: The ophthalmoscopic examination may be entirely negative or a uniform narrowing of the arteries and arterioles may be present.

b. Heart: Examination of the heart is usually negative; there are no cardiac enlargement and no murmurs and the electrocardiogram is normal.

c. Kidneys: There is no evidence of impaired renal function. The blood urea nitrogen, the total nonprotein nitrogen, and blood proteins are normal. The results of the Mosenthal test, which I consider the best and simplest test of renal function, are normal.

2. *Moderately Advanced Hypertensive Disease.*—

a. Retina: The changes of the retinal vessels will vary from uniform narrowing to irregularity in outline, accompanied by arteriovenous compression.

b. Heart: The heart is usually enlarged and assumes the typical cardiac silhouette indicative of left ventricular enlargement. No murmurs are present, but the second aortic sound is frequently accentuated. The electrocardiograph is normal except for the presence of left axis deviation.

c. Kidneys: There is no evidence of impaired renal function. The blood urea nitrogen and nonprotein nitrogen and the blood proteins are normal. The urinary Mosenthal test may possibly show a slight change in the night-day ratio.

3. *Advanced Hypertensive Disease.*—

a. Retina: Increased sclerosis is evidenced by changes in the caliber of the vessels and the width of the reflex stripe in the arteries. Retinal hemorrhages and papilledema are also frequently seen.

b. Heart: The heart is markedly enlarged. A systolic murmur is frequently elicited over both the apical and aortic areas, the former being a compensatory insufficiency due to the enlargement of the left ventricle and the latter due to atherosclerosis of the ascending aorta. The electrocardiograph, in addition to left ventricular preponderance, shows evidence of myocardial damage with widening and spread of the main ventricular deflection and T wave inversion in one or more leads.

c. Kidneys: Evidence of nitrogenous retention and markedly impaired renal function occurs. The blood urea nitrogen, nonprotein nitrogen, and creatinine are increased. The total blood proteins are reduced and the albumin-globulin ratio is altered and may be reversed. The Mosenthal test shows a fixation of the specific gravity at a low level with an alteration of the night and day output ratio.

THERAPY

The objective of therapy obviously must differ according to the stage of hypertension. In early and moderately advanced hypertension the objectives are to (1) convert the hypertension, if active, into the inactive phase and watch for recurrences of activity; (2) lower the blood pressure, and (3) prevent complications. Therapy in advanced hypertensive vascular disease is directed toward the treatment of the complications as they occur. Therapy at its best has certain limitations, but I maintain that hypertension can be controlled and the progress of degenerative changes can be retarded. In my experience the following general regime can accomplish these objectives in the average case in which the cause has been removed or is indeterminate or irreversible.

1. *Rest.*—Mental and physical rest is undoubtedly the best means at our disposal for lowering blood pressure. The influence of rest on hypertension is easily demonstrated by the notably lower blood pressure in the mornings. Ten to 12 hours of bed rest a day is insisted upon in the early and moderately advanced hypertensive patient, and from 12 hours to complete bed rest, depending upon symptomatology, is insisted upon in advanced hypertensive vascular disease.

2. *Diet.*—In the management of hypertension the watchword is moderation. This applies to diet as well as to all other aspects of treatment. In early and moderately advanced hypertensive disease I recommend a normal, varied, well-balanced diet which, while avoiding an excess of proteins or sodium chloride, provides an adequate caloric intake along with sufficient amounts of vitamins, particularly vitamins A, B, and C. For the average well-nourished adult, such a diet should contain 1800 to 2000 calories and should consist of approximately 200 gm. of carbohydrate, 70 gm. of protein, and 100 gm. of fat. To impose unnecessary restrictions in diet upon such patients is often productive of more harm than good. The unnecessary restriction of protein has little or no effect upon the hypertension and it may seriously disturb body nutrition and even induce protein deficiency with its accompanying anemia and edema. Just as too stringent restriction of protein is to be avoided, there is also no advantage in allowing an excessive protein intake.

In advanced hypertensive vascular disease when arteriolar changes are manifested in the kidneys and the heart muscle shows evidence of failure, appropriate dietetic management is indicated to combat renal and cardiac failure. The proteins are increased and sodium restricted in heart failure, and both the proteins and sodium are restricted in renal failure.

Two other types of dietary therapy must be mentioned. The first is the "rice diet" as described by Kempner.[18] For the average patient this diet is intolerable, and in the group I have observed no one has remained on it for more than 3 weeks. The second is the low sodium diet as described by Grollman and Harrison.[19] There is no convincing evidence to show that uncomplicated hypertension is influenced to any noteworthy degree by excluding salt from the diet.

It is my impression that there is no specific diet suitable for all cases of hypertension. When renal and cardiac complications occur, the dietetic restrictions indicated in those conditions should be followed. So long as these complicating factors are absent, however, dietetic regulations should be instituted not so much with the idea of reducing blood pressure as for the purpose of correcting associated metabolic faults.

3. *Osteopathic Manipulative Therapy.*—Long and Deming,[20] in 1943, demonstrated in a series of well-controlled experiments that sudden mobilization of the upper dorsal vertebrae produced a lowering of blood pressure. Although there is no evidence that hypertension originates as a disorder of the autonomic nervous system, it has always been taken for granted that whatever the origin, the arteriolar constriction which entails the rise in pressure is produced by augmented tone of the sympathetic vasoconstrictor nerves. The success obtained by splanchnic section and other operations on the sympathetic nervous system indicates that the autonomic nervous system is in some way concerned in the pathogenesis of hypertension.

It, therefore, seems very plausible that direct osteopathic manipulation of the vertebrae affects the autonomic nervous system in a similar fashion. All of my patients with hypertensive vascular disease receive regular osteopathic manipulative treatment and I am convinced of its efficacy. Unfortunately, however, there is insufficent scientific evidence to support this conception, but it assuredly merits further consideration and investigation.

4. *Philosophy of Life.*—It is widely held that the stress and strain of modern life predisposes to hypertensive disease. Whether this is accomplished through an effect on the central or sympathetic nervous systems or on the endocrine glands is not known at present, nor important in this discussion. But the fact that hypertensive disease can be precipitated or aggravated by emotional stress is generally agreed upon.

I have found it to be of paramount importance for the patient to have some fundamental understanding of the disease with which he is afflicted. He must understand that *he* is being treated rather than his blood pressure and that there are certain portions of the treatment which he must perform. Unless he is willing to assume this responsibility and make the necessary sacrifices and adjustments, treatment of any type is usually futile.

5. *Sedation.* Sedatives are often of great benefit to hypertensive patients. They assist in obtaining the relaxation so necessary for adequate rest. Mild sedation to diminish the constant fretting turmoil is all that is necessary. For this purpose small doses of phenobarbital given at regular intervals is usually sufficient.

It is my contention that hypertensive disease, if detected early, is controllable by this regime. It is not

contended that this regime is curative and it is recognized that despite treatment, the progression toward more and more organic damage often continues. It is also admitted that in a minority of patients this regime is of no avail; for these patients one of the three so-called "specific therapies" is used.

1. *Specific Medicinal Treatment.*—Of the countless drugs that have been used in the treatment of hypertension, none has proved to be of particular value except thiocyanate. This drug has been held as impractical because it has been observed that its hypotensive effect is closely associated with a toxic effect. For this reason it had long been abandoned until interest in the drug was revived by Barker[21] who reported satisfactory results in hypertension without toxic effects by maintaining blood cyanate levels of from 8 to 12 mgm. per 100 cc. He reported that toxicity begins to appear only when the blood level reaches 15 to 30 mgm. per 100 cc. My interest in this therapy has been stimulated by the work of Griffith and Lindauer,[22] who in addition to devising a micro method for the determination of thiocyanate blood level, demonstrated that thiocyanate therapy tends to increase capillary fragility and may, therefore, predispose to apoplexy. They also found the drug tends to increase lymphatic flow and is invariably ineffective if given to a patient whose flow is already increased. These investigators recommend the Göthlin index as a reliable test for the measurement of capillary fragility and the patent blue test for the measurement of rate of cutaneous lymphatic flow.

Petechial Index (After Göthlin Technic).—1. A circular area, 6 cm. in diameter, is marked off in each antecubital space.

2. First stage: A blood pressure cuff around each upper arm is inflated to 35 mm. of mercury for 15 minutes and thereafter the petechiae are counted.

3. Second stage: After an hour, the first stage is repeated, using 50 mm. cuff pressure.

Calculation:

Petechiae at first stage $\times$ 2 + petechiae at second stage = P. I.

Normal = 8 (or less) Increased = 13 +

Borderline, probably increased, 9-12

Technic for Measuring Cutaneous Lymphatic Flow.—

1. The blue colloidal dye, patent blue, is used, purified according to the method of McMaster.

2. After intracutaneous injection of 0.04 cc. of dye in the antecubital space the spread of streamers is followed for 15 minutes. Spread during the first minute is due to the force of the injection. From the first to the fifteenth minute, the spread should be no more than ¾ inch. A greater spread indicates an increased flow.

3. The color disappears, always within 2 days, often in 18 hours. No reaction occurs and no permanent discoloration remains. Occasionally a transient redness is seen about the area of injection, lasting 1 hour.

Griffith and Lindauer[22] report increased capillary fragility as measured by the method of Göthlin in about 18 per cent of hypertensive subjects and 36 per cent of the subjects with increased fragility show increased lymphatic flow with the patent blue test. When increased capillary fragility and increased cutaneous lymphatic flow are found, either alone or associated, both can be normalized by rutin therapy.

Rutin is a nontoxic substance which can be given in a dosage of 20 mgm. three or four times daily. In addition to its ability to stabilize capillary fragility and cutaneous lymphatic flow, rutin may also lower blood pressure and relieve hypertensive symptoms. This effect, however, is extremely variable.

In my experience, rutin and thiocyanate have been helpful in the management of those cases of early and moderately advanced hypertensive vascular disease which do not respond to the regime of rest, diet, osteopathic manipulative therapy, adjustment of philosophy of life, and sedation already given in detail. I have experienced no serious toxic effects from thiocyanate since maintaining carefully controlled blood levels. The Göthlin index and cutaneous lymphatic flow test have been valuable in aiding in the selection of patients and in the prevention of the dreaded complication of hemorrhage.

My present program of thiocyanate dosage consists of an initial dose of 0.2 gm. of potassium thiocyanate three times daily. The thiocyanate blood level is determined at the end of 1 week. The original dose is then continued or increased. For example, in a given case the initial dose of 0.6 gm. daily resulted in a blood level at the end of 1 week of 6 mgm. per 100 cc. The dose was then increased to 0.8 gm. daily and at the end of a week the blood level was 10 mgm. per 100 cc. This is regarded as the optimal blood level. A maintenance dose of 0.1 to 0.2 gm. was then continued. As long as thiocyanate is being given, blood levels are determined once every 3 weeks. During the initial period when the dose is being adjusted to secure a therapeutic level, blood levels are determined weekly.

If a blood level of 10 mgm. is maintained for 3 weeks and no appreciable drop in blood pressure occurs, the treatment is abandoned. A successful case has been arbitrarily defined as one in which the systolic pressure falls to 175 mm. or lower with a corresponding fall in the diastolic pressure and with a moderate to marked subjective improvement.

2. *X-ray Therapy.*—This therapy is not new in the treatment of hypertension. The department of radiology at the Osteopathic Hospital of Philadelphia has been using this treatment for the past 12 years. Approximately 150 cases have been treated and the results have been encouraging. Of the cases treated, satisfactory results have been obtained in 85 per cent. The majority of these cases have been the menopausal type of early and moderately advanced hypertension.

The criteria for selection of cases consist essentially of normal renal function, normal gynecological background, normal blood chemistries, and a Smithwick classification of the eye grounds.

The treatment consists of one course of sixteen treatments. The therapy is directed to the centers in the diencephalon and along the entire vegetative axis. Eight ports are used and each port is treated four times. Two ports are treated at each session.

The objective of therapy is to lower the blood pressure approximately 40 mm. and to stabilize it at this point. This is supposedly accomplished by stabilizing and normalizing the chemical transmitters in the nerve endings and ganglion centers. A local vasodilating effect also occurs but this apparently has little or no effect upon the blood pressure.

The usual response consists of a fluctuation in the blood pressure during the early phases of treatment. Decline in the blood pressure usually occurs

when one half of the course of treatment has been completed, and stability of the blood pressure occurs approximately 6 to 8 weeks after the entire course of treatment has been completed.

3. *Surgical Treatment.*—Despite numerous theoretical objections, the past few years have witnessed increasing interest in the surgical treatment of hypertension.

The criteria for operation suggested by Peet[23] are as follows: a patient below 54 years of age, a more or less continuously elevated blood pressure with a systolic pressure over 170 and a diastolic pressure above 105, a nonprotein nitrogen below 45 mgm. and preferably below 40 mgm. per 100 cc., a well-compensated heart, and relatively normal cerebral function.

The criteria used by Smithwick[24] are essentially the same except that emphasis is placed upon the pulse pressure. Three types of pulse pressure are defined:

1. Narrow pulse pressure—pressure is less than one half of the diastolic pressure.

2. Intermediate pulse pressure—pressure is equal to or up to 19 mm. more than one half the diastolic pressure.

3. Wide pulse pressure—pressure is 20 mm. or more greater than one half the diastolic pressure.

The response to surgical treatment and the prognosis are best in types 1 and 2 and poorest in type 3.

Three general groups of surgical procedures for the treatment of hypertension have been tried. They are (1) renal denervation, (2) adrenal denervation or partial adrenalectomy, and (3) sympathetic denervation. The first two of these procedures have been abandoned. The last, sympathetic denervation, appears to be the procedure of choice. Different technics for denervation of the sympathetics are used in various clinics. These technics differ chiefly in the extent of denervation. The least extensive is the subdiaphragmatic splanchnicectomy of Craig.[25] Peet[23] recommends the bilateral supradiaphragmatic splanchnicectomy which is considerably more extensive. A more complete denervation is used by Smithwick[24] which is a combination of the two operations mentioned above. The most extensive operation is the nearly total sympathectomy of Grimson.[26]

Further data are required before the relative value of these surgical procedures can be determined. Since all the operations demand considerable skill on the part of one already well versed in neurosurgery, the choice is apt to be dictated by the experience of the surgeon available rather than the merit of the individual procedure.

The anticipated results of the surgical treatment of hypertension cannot be spoken of in terms of a "cure." The best that can be hoped for from the present operations is a temporary palliation over a postoperative period ranging from 1 to 12 years.

Peet[23] reports that improved renal function and favorable effect on headache, dyspnea and other subjective symptoms were often more striking and proportionately more pronounced than the fall in blood pressure. Page and Heuer[27] have observed similar symptomatic response. Adson and his associates[28] also report the effect on the blood pressure as being slight and the effect on the symptoms proportionately more favorable.

The results of surgical treatment can be briefly summarized in terms of:

1. Slight to moderate reduction in blood pressure
2. Moderate to marked alleviation of symptoms
3. Relief of incapacitation
4. Possible prolongation of life.

SUMMARY

The etiology, diagnosis and therapy of hypertensive vascular disease have been discussed. Clinical methods, not requiring extensive laboratory investigation, have been stressed.

48th and Spruce Sts.

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THE DONORA DISASTER

During the last week of October, 1948, a heavy smog settled over the area of southwestern Pennsylvania in which the industrial town of Donora is located. Smogs of short duration are not uncommon there and except for discomfort due to irritation and the nuisance of dirt and poor visibility, no particular significance had been attached to such occurrences.

However, the smog which encompassed the Donora area on the morning of Wednesday, October 27, was unusually dense, enough so to evoke comment from the residents. But it was not until Saturday that the smog began to take its terrible toll. Between 2 a.m. and 11:30 p.m. seventeen residents died; two more died on Sunday, and the twentieth died a week later.

By the time the twentieth death had occurred, the news of the disaster had spread to the entire Nation and the Division of Industrial Hygiene of the United States Public Health Service had been requested to conduct an investigation. On October 14, 1949, the results of the year-long investigation were released by Federal Security Administrator Oscar F. Ewing. This 173-page report[1] revealed for the first time that in addition to the twenty deaths, 5,910 persons were made ill by the 5-day smog over the Donora area. It can now be said what could not previously be said with scientific proof—that contamination of air in industrial areas can cause serious acute disabling disease.

In his Foreword to the Report, Leonard A. Scheele, Surgeon General of the United States Public Health Service, says:

> This study is the opening move in what may develop into a major field of operation in improving the Nation's health. We have realized, during our growing impatience with the annoyance of smoke, that pollution from gases, fumes, and microscopic particles was also a factor to be reckoned with. But it was not until the tragic impact of Donora that the Nation as a whole became aware that there might be a serious danger to health from air contaminants.

It is indeed true that the Nation as a whole had not been alerted to the danger of atmospheric contamination, but the subject has not gone unnoticed, nor has it been passed without comment. For years Clarence Mills[2] has been conducting important and revealing studies of the smoke menace in urban areas. The sixty deaths during a period of intense fog near Liege, Belgium, in 1930 set off a series of investigations and reports.[3,4]

But it took the Donora disaster to start proceedings that may possibly lead to cleaner and safer air in industrial areas in the United States. Although industries have frequently been resistant to the installation of expensive air pollution controls, they are beginning to learn that the economic rewards are great. Much fuel is being saved and valuable chemicals are being salvaged by such installations.

In 1947 Alexander Levitt[5] published in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION an abstract of his exhaustive study on degenerative diseases including cancer. This study was prompted "by an awareness of the serious lags in preventive medicine—an awareness of inadequate correlation of discoveries in many sciences that seem to favor the progression of man's 'civilized' diseases." Levitt called attention to the many evidences that cancer and other degenerative diseases are related to modern environmental conditions, with special reference to air pollution. He recommended practicable and concrete steps to be taken in the control of untoward effects of pollutions, contaminations, and deficiencies leading to serious and disabling illnesses.

In closing Levitt called upon each osteopathic physician, physicians of other schools of medicine, workers in allied sciences, educators, civic leaders, and all concerned with public health and welfare to consider the challenge of cancer and other degenerative diseases. Let us hope that his is not a voice calling in the wilderness and that it will not require other "Donoras" to focus attention on the need for study and control of other adverse environmental conditions.

THERE'LL BE CHANGES

The Fifty-Fourth Annual Convention of the American Osteopathic Association will be held at the Stevens Hotel, Chicago, July 10 to 14, 1950. Aside from the social and entertainment aspects, for which American Osteopathic Association conventions have always been outstanding, the excellence of its technical presentations is annually anticipated by members. Excellent though

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professional programs have been in the past, there has long been a feeling in many quarters that a rearrangement would be desirable. Heretofore so many technical discussions in small groups have occurred simultaneously that it has been impossible for many to attend more than a part of the lectures they have desired to hear. Afternoon teaching sessions have been divided into groups designated by specialty practice and frequently have been held in locations inconveniently distant from each other.

The 1950 Convention will have as its keynote, "The Integrated Concept of Health As Reflected in Osteopathy," and that integration will be emphasized not only in the program material itself but in the method of presentation. Meetings of small groups segregated by specialty practice will be discontinued. There will be only two teaching sessions each afternoon at which pursuant to the theme of integration, physicians from every branch of osteopathic practice will speak on a central theme.

Insofar as time permits, the daily themes will be begun in the morning general sessions and carried through the entire day. These themes have been taken from the current list of the ten leading causes of death in the United States, which, as far as possible, have been combined into syndromes comprising the conditions which osteopathic physicians meet daily in their practices. The teaching sessions will be attended by much larger groups but will cover subject material more thoroughly than previously has been possible. Both general practitioners and specialists will contribute of their knowledge on specific syndromes. When it is indicated, the day's first presentation will cover the related anatomy, physiology, and pathology. Formal presentation of papers will be relatively short with sufficient time allowed for questions and discussion. The osteopathic manipulative approach to all of these syndromes will not only be discussed but will be demonstrated as well. The two afternoon teaching sessions will be held in rooms which are relatively close together, making it possible to go from one session to the other to hear particular phases of the same general subject discussed by particular physicians.

It has long been felt that the necessity for specialty training has served to divide the profession into groups of special interest at the sacrifice of unity of purpose. This program is designed to avoid that trend and to bring together the general practitioner and the specialists in discussions of their mutual problems. The general practitioner will be afforded opportunity to become better acquainted with the services of specialists that are available to his patients. Likewise, specialists in any branch can enhance their own professional acuity by reviewing again the comprehensive viewpoint of therapy and at the same time become better acquainted with the contributions made by other phases of professional practice. In short, the program is designed to bring about a more complete understanding of all phases of osteopathic practice to the physician. Again its keynote: "The Integrated Concept of Health As Reflected in Osteopathy."

C. R. NELSON, D.O.
General Program Chairman

ALL THAT GLITTERS IS NOT GOLD

In a recent editorial in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION[1] attention was called to the fact that the "wonder drugs," the sulfas, are really not so wonderful after all. Thus is repeated the age-old story of initial enthusiasm and later disillusionment. Man lives in hope, in a subjective world, and projects outward onto reality the workings of his imaginings and hopes. This weakness of human nature, from which no one is exempt, has resulted in rather elaborate precautions on the part of scientists to safeguard and assure the truth and correctness of the data of science. It has given rise to the concept of "pure" or "exact" science.

However, science is not so exact or objective as we would like to believe. For example, Max Planck[2] notes that

> . . . Monism, founded by outstanding scholars, philosophers, and natural scientists, was a school of thought which commanded high respect only as recently as a short generation ago. Yet, in these our days hardly a word is being heard about the Monists, although the structure of their ideology was unquestionably erected to endure for a long time to come, and it started out on its career with high hopes and great promises . . . if we take a closer look and scrutinize the edifice of exact science more intently, we must very soon become aware of the fact that it has a dangerously weak point—namely, its very foundation.

Even mathematics, the most exact of sciences, has felt the assault of change only recently in the discoveries of Einstein.

Change has a constant element, as it applies to the productions of man, that is, it is dependent on subjective observation. As Planck states it,

> . . . Now then, among all the facts that we do know and can report to each other, which is the one that is absolutely the most certain, the one that is not open even to the most minute doubt? The question admits of but one answer: "That which we experience with our own body" . . . the best start toward a correct understanding of the scientific world picture will be to investigate the most primitive world picture, the naive world picture of the child.

Jerome Frank[3] also notes this element of change,

> . . . we hear much talk of "hard facts." But facts are softer than they appear to the average person . . . since so large a part of our facts was originally man-made and can be changed by man, it is proper to say that every fact is "subjective" in this sense—that it involves a selection made by human beings, and human beings are so constitutionally limited in their perceptions that they cannot possibly know all that is going on in the universe. . . . Facts, then, insofar as they are interpretations of experiences, are not immortal. They are made by mortals and may be changed by other mortals.

Facts become fashionable and are conditioned by the index of acceptability of the time and community in which they are enunciated. Frank[3] states, for example,

> The nabobs of the scientific group may easily frighten into silence the young scientist who has a fresh idea, or who has made a novel observation of "facts," prompted by some unorthodox stimulus and out of step with accepted scientific thinking. . . . Science is in part a function of the pride and prejudice of the scientific tycoons.

1. Editorial: Here we go again. J. Am. Osteop. A. 49:127, Oct. 1949.

2. Planck, M.: The meaning and limits of exact science. Science 110:319-327, Sept. 30, 1949.

3. Frank, J.: The place of the expert in a democratic society. Philosophy of Science 16:3-24, Jan. 1949.

The organization of present-day knowledge relates to the time of St. Thomas Aquinas, who, seeking to clarify the position of the church as it pertained to what was dogma and what was science, set aside science as that which may be perceived and recorded as the product of experience. From then till now the development has been away from direct observation of experience to the computation of mathematical or chemical formulae. In modern circles even a positive clinical demonstration fails to establish a medical truth. The experience of osteopathy is an excellent example of the human nature of scientific minds. The refusal of old-school medical scholars to accept or investigate the persistent effectiveness of osteopathic procedures, because such would not be "fashionable," amounts at times to outright bigotry. This leads to presentations such as that of Phalen[4] in which he advocates as the treatment of backache a laborious exercise and rest regime for 6 or 8 weeks or more. Routine practice by osteopathic physicians has shown consistent correction of such problems in one, two, or three manipulative treatments without the need of "strengthening the muscles by exercises." Theodore Potter in discussing Phalen's paper, is quite right when he says that the importance of backache and similar disabilities must be appreciated and the rationale and technic of therapeutic procedures must be learned if this part of practice is to cease to a fertile field for the cultist and irregular practitioner. The task of M.D. orthopedists would be simpler if they would put aside their "pride and prejudice" and enquire into osteopathic procedures which are not, nor ever have been, secret.

In the field of psychiatry, certainly at best a highly subjective branch of science, this element of positivism and change persists very much as in the more "exact" disciplines. Tredgold,[5] for example, accomplished the rather amazing feat of writing a book on psychological medicine in 1943 and excluding all the advances made in the understanding of dynamics of mind since 1900. He represents an extreme of the differences between the organicists and dynamicists in psychiatry. The extremes of any group are made up of those who lag too far behind current progress and those who project themselves too far ahead.

Always there can be detected in the works of men indications of their subjective characteristics. The self will project itself whether one wills it or not. Inner ruminations that give forth inventions and works of genius are flavored strongly by the emotional nature of the individual who thinks them and are often completely conditioned thereby. Eugene Ziskind[6] in an attempt to analyze psychotherapeutic effectiveness states, "It was possible to recognize (in the clinic) the psychiatrist from his case histories and for each there was a fixed series of psychopathological responses. In other words, the specific problem tended to conform to this psychiatrist's preconceived idealogical commitments." He in turn, however, makes a Freudian slip of the pen in the use of the sentence, "One may classify or pigeonhole all procedures utilized in psychological therapy," giving away his own attitude toward psychotherapy.

Inasmuch as we cannot free ourselves from ourselves, we can only seek a haven in humility. In the face of what is unknown, we should stand in awe, and as Planck says, "venerate the inexplorable."

THOMAS J. MEYERS, Ph.D., D.O., F.A.C.N.

4. Phalen, G. S.: Diagnosis and treatment of "mechanical backache." J. Am. M. A. 141:445-448, Oct. 15, 1949.

5. Tredgold, A. F.: Psychological medicine. William Wood & Co., Baltimore, 1943, *p.* 298.

6. Ziskind, E.: How specific is psychotherapy? Am. J. Psychiat. 106:285-291, Oct. 1949.

THE ORTHOPEDIC SUPPLEMENT

This issue of THE JOURNAL contains a twenty-four page supplement furnished by The Osteopathic Academy of Orthopedists. The articles in the Supplement cover many phases of orthopedics, including scoliosis, bone grafting, fractures, painful hips in adults, degenerative spinal lesions, and ruptured intervertebral disks. Each article offers the best information available on the particular subject and presents it in a manner which should be of special interest to the osteopathic physician, whatever his field of practice.

The advantages of THE JOURNAL supplements are manifold. The specialty societies which furnish the material are able to give many of their speakers a wider audience than is possible at the meetings where the papers are presented. Much work goes into the preparation of many papers which, if not published for the benefit of the profession at large, reach such a limited number of doctors that the labor involved in preparation seems hardly justified.

On the other side, THE JOURNAL, by having the privilege of publishing papers written by authorities in the various specialties, is able to give all its readers more and better information on practically every phase of modern practice than would be possible without the cooperation of the various groups who make the supplements possible.

OSTEOPATHY AND THE MARCH OF DIMES

The annual campaign for funds by The National Foundation for Infantile Paralysis known as "The March of Dimes" is to be held the last 2 weeks of January. The osteopathic profession will be solicited for contributions and the Central office will receive many inquiries as to whether or not donations should be given.

It may be said that the policy of The Foundation at the national level has been cooperative and friendly. While the local districts of the national group are controlled by local chapters and, in some instances, are dominated by allopathic physicians, for the most part patients of osteopathic physicians have received the same consideration as those of other physicians.

The Foundation and its chapters make funds available for the care of polio patients who cannot pay. Emergency respirator service is made available and braces and other such aids are provided when necessary by Foundation funds. Certain rules and regulations have been established which must be complied with to obtain assistance and, in most localities, certain hospitals or medical centers have been desig-

nated as those to which patients must be taken to receive care under the program.

There are many instances where the patients of osteopathic physicians have been accepted and have received care or orthopedic appliances after recovery. It is the policy of The Foundation not to discriminate against the osteopathic school of practice and the relationship between it and the American Osteopathic Association has been most friendly.

Literature, both for lay and professional use, published by The Foundation is available to osteopathic physicians upon request.

While The Foundation does try to aid research in infantile paralysis whenever it has available funds, this service has been greatly curtailed. At present any money which can be devoted to research is being used for the purpose of studying methods of treatment. No funds have been made available to any osteopathic research project, nor has any attempt been made to obtain such grants.

Of all the similar national organizations, perhaps The National Foundation for Infantile Paralysis is most deserving of osteopathic support.

J. R. FORBES, D.O.

Department of Professional Affairs

ALLAN A. EGGLESTON, D.O.
Chairman
Montreal, Canada

COMMITTEE ON SPECIAL MEMBERSHIP EFFORT

STEPHEN B. GIBBS, D.O.
Chairman
Coral Gables, Florida

HELP INCREASE EFFICIENCY AND REDUCE OVERHEAD EXPENSE

We hear a lot about reducing our government expense. Why? Because people say it would lessen our tax burden. It is common practice in almost any business to work for greater efficiency so that cost of production will be lower. You all agree that is good business. With 100 per cent cooperation of everyone in our profession, the services rendered to our doctors could be considerably increased at much less expense. Here are two important items.

1. Of the 3,300 nonmembers in our profession there are at least 2,000 who are financially able to help carry the burden of expense. That would add another $100,000 to our yearly income.

2. Of the almost 8,000 members, about half require second and third dues notices. A quarter of them receive notices several times. If everyone paid his dues when he received the first notice, several thousand dollars of overhead expense could be saved in the A.O.A. office.

Each member of the Board of Trustees, and every delegate and alternate representing divisional societies in the House of Delegates pledged help to the membership committee in the work of collecting delinquent dues for the current year. If you have not as yet paid your dues for the current year, do so now and save extra work and your own embarrassment. If you know nonmembers who are eligible and financially able to maintain A.O.A. membership, urge them to join.

"This Is Membership Year."

1. Pay dues immediately.
2. Urge nonmembers to help carry the burden.

Help increase A.O.A. efficiency so that greater service can be given members of the osteopathic profession.

Again—*"This Is Membership Year."*

Make it 8,000 by June 1, 1950.

STEPHEN B. GIBBS, D.O.

MEMBERSHIP REPORT AS OF NOVEMBER 1, 1949

Membership count, October 1, 1949		7,834
Applications received in October, 1949	21	
Graduates licensed in October, 1949	25	
	46	
Deaths and resignations in October, 1949	11	
Gain in October, 1949		35
Membership Count, November 1, 1949		7,869

HONOR ROLL

Thomas Baker — Morris F. Beal — Dorothy J. Marsh

GRADUATE COURSE OFFERED

Philadelphia College of Osteopathy—The Graduate School.—Advanced courses in osteopathic cranial therapy, January 23-28. Class limited. Tuition $150. Make application to the office of the Dean, 48th and Spruce Sts., Philadelphia 39.

Department of Public Affairs

JOHN W. MULFORD, D.O.
Chairman
Cincinnati

BUREAU OF PUBLIC EDUCATION ON HEALTH

JOHN P. WOOD, D.O.
Chairman
Birmingham, Mich.

PUBLIC EDUCATION ON HEALTH CONFERENCE

For the third consecutive year the Bureau of Public Education on Health of the American Osteopathic Association will hold a conference relating to public health problems. The conference, as before, will be held in Chicago and the date set this year is January 28. As has been the custom in previous years the Public Education on Health Conference will form an integral part of a series of conferences and discussions held by leaders of the osteopathic profession at that time. On January 26 and 27, the 2 days preceding the Public Education on Health Conference the Council on Osteopathic Education of the American Osteopathic Association will meet. On the 2 days following the Public Education on Health Conference, the Society of Divisional Secretaries will hold a conference. The dates for the Society of Divisional Secretaries' meeting are January 29 and 30.

The agenda for the Bureau of Public Education on Health Conference has already been tentatively prepared and its content, as usual, only awaits further suggestions and recommendations from members of the divisional societies. In the past the divisional society officers and members have taken

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